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Brucellosis: Consideration of Its Epidemiology, Diagnosis and Control*

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DURING 1930–1941, there were reported in the 48 states of this country 29,594 cases of brucellosis, an average annual rate of 1.87 per 100,000 population.† Officially notified cases in Iowa totaled 1,887 for the same 12 year period, the average annual rate being 6.25 per 100,000.

Direct contact with infected animals and use of raw milk products from infected dairy cows provide the chief means of transmission to man of brucellosis or undulant fever. This statement applies to Iowa, probably also to many if not all of the cattle and hog raising states. As pointed out by Hardy and associates,[1] direct contact with hogs must be considered a major factor to account for the relatively high incidence of brucellosis in the midwestern states of this country. Cases resulting from direct contact, whether with infected hogs or cows, are usually of sporadic nature; such cases in the aggregate, apparently exceed in number those traceable to contaminated dairy products.

Milk-borne brucellosis likewise, is nearly always of sporadic occurrence when *Brucella abortus*, the bovine type of organism, is the etiologic agent. On the other hand, when the porcine strain, *Brucella suis*, gains access to the udder of a dairy cow to contaminate a raw milk supply, multiple cases of the disease may be fully expected. This may be due to the fact that *Brucella suis* is more highly pathogenic than *Brucella abortus* and that the former multiplies more rapidly in a milk medium under ordinary atmospheric conditions than does the bovine strain of brucella.

Brucellosis lends itself favorably to epidemiologic study. The organism has

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† A table containing annual reports from the 48 states covering the 12 year period 1930–1941 may be had on request of the Iowa State Department of Health, Des Moines, Ia.

distinct morphologic and cultural characteristics, and can readily be isolated from blood, although such isolation may require several weeks to a month or longer. Agglutination, intradermal and other tests are available to throw light on the nature of infection and immunity. The disease in the animal reservoir and in the experimental animal also affords opportunity for determination of virulence, manner of spread and source of infection.

It is desired in this report to limit consideration to milk-borne brucellosis; information as presented is based on an investigation of two cases caused by *Brucella abortus* in Madrid (Boone County), Iowa, and on the study of an epidemic in Marcus, Iowa, in which *Brucella suis* was the inciting agent.

MADRID INVESTIGATION AND SURVEY (BRUCELLA ABORTUS)

On July 2, 1942, Mr. A. L., 68, a resident of Madrid (Pop. 2,074), Boone County, Iowa, began to complain of tired feeling, pain in back of neck, fever (102°), chills and sweats. Three weeks later, the patient's serum was found to agglutinate brucella antigen in a dilution of 1:1,280. The patient gave no history of direct contact with farm animals, but during the months antedating illness, had used two glasses daily of raw milk from a local, the C. S., dairy. Through coöperative arrangement between the State Department of Health, the Bureau of Animal Industry, and the State Department of Agriculture, local veterinarians were authorized to obtain blood specimens from dairy herds which supplied milk in the community. Of 13 cows in the C. S. dairy, 9 proved to be reactors to the agglutination test for Bang's disease. The dairyman concerned, a thoroughly coöperative person, sold no milk to patrons after July 31. Other herds were not tested at the same time, due mainly to misunderstanding on the part of producers with respect to accuracy of the agglutination test.

Although a blood culture from the patient failed to yield *Brucella abortus*, it is highly probable that infection was due to brucella of bovine type. This organism was later isolated from guinea pigs, following subcutaneous injection of cream from reactor cows.

While sporadic cases had developed from time to time in rural areas of the county, the case of brucellosis in Madrid was the first to come under observation of local physicians in a period of more than a decade. In addition to the patient, it was assumed that scores of children and adults in many homes had been exposed to the contaminated milk supply. With the interest and aid of local physicians, school superintendent, and parents, arrangements were made for blood specimens to be obtained for the agglutination test and for skin tests to be administered, using brucellergen. Such a survey was conducted in the school building on August 11, 1942, and again, for the most part on a different group, on September 29. Record was kept of the age and sex of volunteers, of residence in town or country, and of the source of milk supply.*

RESULTS OF AGGLUTINATION TESTS

The agglutination tests were carried out at the State Hygienic Laboratory, beginning with a titer of 1–5. The results as summarized for a group of 147 persons, are presented in Table 1. Males and females being considered equally susceptible to brucellosis of milk-borne character, the whole group was classified according to three age groups, 1–9, 10–19, 20 and over. Further classification was made under two headings, including on the one hand consumers of the "contaminated milk supply" and, on the other hand, those

* The authors desire to acknowledge the valued assistance in the investigation at Madrid of Glen M. Grout, Sup't of Schools, R. A. Gamble, M.D., M. M. Shaw, M.D., and J. O. Cook, M.D.

who had used "other milk supplies." "Other milk supplies" refers to five producers of raw milk and to "own cows" of those from the surrounding rural area.

It will be noted that among 63 users of the contaminated milk supply, 18, or 28.6 per cent, showed agglutination in titers ranging from 1:5 to 1:40, the titer of but one person being 1:40. Of 84 individuals of all ages, representing consumers of "other milk supplies," 17, or 20.2 per cent, showed positive agglutination, 16 in titers of 1:5–1:20 and one in the 1:40 dilution.

These results, based as they are on a comparatively small number of people, some of whom used milk and cream only sparingly, are hardly remarkable. A similar agglutination survey, in a sanatorium or institution with an abundant per capita use of raw milk from infected dairy cows, would probably be accompanied by more significant evidence of latent infection.[2]

RESULTS OF SKIN TESTS

Intradermal tests were administered with brucella nucleoprotein, known as brucellergen and made according to the method of I. Forest Huddleson, D.V.M., Research Professor in Bacteriology, Michigan State College, East Lansing, Mich. Two types of antigen were supplied for this survey through the courtesy of Dr. Huddleson, prepared separately from *Brucella abortus* (dilution 1:12,000) and *Brucella suis* (1:4,000). Each person received two intradermal tests (0.1 ml.) on the inner aspect of the forearm, brucellergen abortus above and brucellergen suis below. Each preparation was further diluted to 1:60,000 and 1:20,000 respectively to avoid the possibility of a severe reaction in those who might be markedly allergic.

Skin reactions were observed and measured after an interval of 48 hours, an area 2 x 2 cm. in diameter, with redness, induration, and tenderness being recorded as positive. The results are set forth in Table 2. As in Table 1, those tested were divided into three age groups, 1–9, 10–19, 20 and above, and according to use of "contaminated" and "other milk supplies." Skin tests were performed on 170 volunteers. Among 71 who had used the contaminated milk supply, 10, or 14.1 per cent, had positive reactions; of 99 consumers of other milk supplies, 12 or 12.1 per cent, showed allergic response.

It is of interest to note that among 27 children of the age group 1–9, 13 of whom used the contaminated milk, all showed negative skin reactions.

There was no notable difference in size, redness, or induration between the reaction produced by brucellergen abortus and that resulting from brucellergen suis.

OCCURRENCE OF A SECOND CLINICAL CASE

Among those who participated in the agglutination and skin test survey on August 11 were Mr. and Mrs. D, aged 40+, residents of the city and exposed to the contaminated milk supply. Mr. D's agglutination test was negative, his skin tests strongly positive. Agglutination and skin tests were both negative in the case of Mrs. D, but she began to complain of fever and indisposition about September 1. On September 10, a second blood specimen showed agglutination of brucella in a dilution of 1:320, and the skin test had become positive. It seems probable that this woman carried a latent infection on August 11, in spite of negative skin and agglutination tests. Among 30 other individuals whose serum when taken August 11 showed no agglutinins or titers not higher than 1:5 or 1:10, 21, or 70 per cent, were entirely negative when the agglutination test was repeated on September 29.

TABLE 1

Agglutination Tests for Brucellosis in Relation to (1) a Raw Milk Supply Contaminated with Brucella Abortus and to (2) Other Milk Supplies in Madrid, Boone County, Iowa, 1942

Age Group	Contaminated Milk Supply Agglutination Reaction						Other Milk Supplies Agglutination Reaction						All Milk Supplies Agglutination Reaction					
		Negative		Positive				Negative		Positive				Negative		Positive		
	No. Tested	No.	%	1:5 1:20	1:40 1:80	%	No. Tested	No.	%	1:5 1:20	1:40 1:80	%	No. Tested	No.	%	1:5 1:20	1:40 1:80	%
1–9	1	1	100.0				4	4	100.0				5	5	100.0			
				0	0	0.0				0	0	0.0				0	0	0.0
10–19	14	10	71.4				46	36	78.3				60	46	76.7			
				4	0	28.6				9	1	21.7				13	1	23.3
20 and over	48	34	70.8				34	27	79.4				82	61	74.4			
				13	1	29.2				7	0	20.6				20	1	25.6
Totals	63	45	71.4				84	67	79.8				147	112	76.2			
				17	1	28.6				16	1	20.2				33	2	23.8

TABLE 2

Skin Tests with Brucellergen in Relation to (1) a Raw Milk Supply Contaminated with Brucella Abortus and to (2) Other Milk Supplies in Madrid, Boone County, Iowa, 1942

Age Group	Contaminated Milk Supply Skin Test Reading					Other Milk Supplies Skin Test Reading					All Milk Supplies Skin Test Reading				
		Negative		Positive			Negative		Positive			Negative		Positive	
	No. Tested	No.	%	No.	%	No. Tested	No.	%	No.	%	No. Tested	No.	%	No.	%
1–9	13	13	100.0			14	14	100.0			27	27	100.0		
				0	0.0				0	0.0				0	0.0
10–19	14	14	100.0			57	50	87.7			71	64	90.1		
				0	0.0				7	12.3				7	9.9
20 and over	44	34	77.3			28	23	82.1			72	57	79.2		
				10	22.7				5	17.9				15	20.8
Totals	71	61	85.9			99	87	87.9			170	148	87.1		
				10	14.1				12	12.1				22	12.9

MARCUS INVESTIGATION AND SURVEY (BRUCELLA SUIS)

On September 10, 1941, investigation was made in Marcus (population 1,206), Cherokee County, Iowa, of 13 cases of brucellosis. These cases, verified by positive agglutination findings at the State Hygienic Laboratory, were reported by the local health officer and attending physician, to the District Health Service and to the State Department of Health. All of the patients gave the history of having been supplied with milk from the W. H. dairy, distributor of raw milk. Delivery of milk from this dairy was stopped September 10, 1941. In spite of early removal of the contaminated milk supply, additional cases came to attention through the remaining months of 1941. In the entire outbreak, 77 persons were found to have active or latent infection as confirmed by positive agglutination tests. Of a series of 29 blood cultures, 13 yielded brucella, all strains being identified as *Brucella suis*.

Agglutination tests for Bang's disease, performed on serum of cows in the W. H. dairy, showed three positive (and one suspicious) reactors. *Brucella suis* was isolated from the cream of two reactors. Hogs on the dairy farm were also found to be infected.[4]

The Marcus milk-borne epidemic caused by *Brucella suis* was the second of its kind to be investigated in Iowa; the first outbreak occurred in 1933 and was reported by Beattie and Rice.[5]

In order to obtain additional information as to the extent of infection in the Marcus community, blood specimens for agglutination were secured and skin tests performed on students and adults in the public and parochial schools.*

RESULTS OF AGGLUTINATION TESTS

Findings of the agglutination survey are presented in Table 3. Here also, those contributing specimens have been classified into the age groups 1–9, 10–19, 20 and above, and according to whether the "contaminated milk supply" or "other milk supplies" were used during the months preceding the epidemic. The group totalled 204; among 33 who had been exposed to contaminated milk, 12, or 36.3 per cent, showed positive agglutination for brucellosis, all in diagnostic dilutions varying from 1:80 to 1:2,560. Five children were under 10 years, the remaining 7 between 10 and 19 years of age. There was no instance of agglutination in diagnostic titer among 171 consumers of other milk supplies.

RESULTS OF SKIN TESTS

Material for performing intradermal tests with brucellergen, was supplied through the courtesy of Dr. Huddleson of Michigan State College. Two separate antigens were used without further dilution, one prepared from *Brucella abortus* (1:12,000), the other from *Brucella suis* (1:4,000). One girl of teen age whose agglutination test was negative, but who was apparently very allergic, showed a severe reaction, with subsequent necrosis of the skin and subcutaneous tissues. In a few instances, individuals showed a more marked reaction with brucellergen suis than with brucellergen abortus.

A summary of results of the series of intradermal tests is contained in Table 4. A striking difference will be noted in the percentage of positive skin tests among those using contaminated milk as compared with those whose milk came from other sources. Among 57 persons of all ages who used the contaminated milk supply, 42, 73.7 per cent, showed positive skin reactions, whereas 17, or 10.8 per cent, of 158

* Acknowledgment is made of the valued assistance in the investigation at Marcus of Father E. M. McEvoy, H. Wood, Sup't of Public Schools, and M. F. Joynt, M.D.

TABLE 3

Agglutination Tests for Brucellosis in Relation to (1) a Raw Milk Supply Contaminated with Brucella Suis and to (2) Other Sources of Milk in and near Marcus (Pop. 1,200), Cherokee County, Iowa, 1941

Age Group	Contaminated Milk Supply Agglutination Reaction					Other Milk Supplies Agglutination Reaction					Total Tested Agglutination Reaction				
		Negative		Positive			Negative		Positive			Negative		Positive	
	No. Tested	No.	%	1:80 1:2,560	%	No. Tested	No.	%	1:80 1:2,560	%	No. Tested	No.	%	1:80 1:2,560	%
1– 9	14	9	64.3	5	35.7	42	42	100.0	0	0.0	56	51	91.1	5	8.9
10–19	18	11	61.1	7	38.9	126	126	100.0	0	0.0	144	137	95.1	7	4.9
20 and over	1	1	100.0	0	0.0	3	3	100.0	0	0.0	4	4	100.0	0	0.0
Totals	33	21	63.7	12	36.3	171	171	100.0	0	0.0	204	192	94.1	12	5.9

TABLE 4

Skin Tests with Brucellergen in Relation to (1) a Raw Milk Supply Contaminated with Brucella Suis and to (2) Other Milk Supplies at Marcus (Pop. 1,200), Cherokee County, Iowa, 1941

Age	Contaminated Milk Skin Test Reading					Other Supplies Skin Test Reading					Total Tested Skin Test Reading				
		Negative		Positive			Negative		Positive			Negative		Positive	
	No. Tested	No.	%	No.	%	No. Tested	No.	%	No.	%	No. Tested	No.	%	No.	%
1– 9	23	8	34.6	15	65.2	70	65	92.9	5	7.1	93	73	78.5	20	21.5
10–19	33	7	21.2	26	78.8	85	75	88.2	10	11.8	118	82	69.5	36	30.5
20 and over	1	0	0.0	1	100.0	3	1	33.3	2	66.7	4	1	25.0	3	75.0
Total	57	15	26.3	42	73.7	158	141	89.2	17	10.8	215	156	72.6	59	27.4

consumers of other milk showed a positive or an allergic response.

FOLLOW-UP OF AGGLUTINATION REACTIONS

On October 18, 1942, another blood specimen for agglutination was obtained by one of us (D.M.H.) with the coöperation of M. F. Joynt, M.D., of Marcus. Of 27 patients, whose serum showed agglutination of brucella antigen in titers from 1:160 to 1:1,280 during the late months of 1941, 7 showed negative agglutination and 16 had titers down to 1:10, 1:20, or 1:40 in October, 1942.

DIAGNOSIS, CONTROL, AND PREVENTION

The isolation of brucella from the blood stream stands first among laboratory aids which confirm the physician's clinical diagnosis of brucellosis. Finding of the organism makes possible its species identification, which in turn helps to establish the source of infection in hogs, cows, or other animals.

The presence of agglutination in diagnostic dilution is second only to the blood culture as an aid in clinical diagnosis. Both rapid and slow methods of agglutination are dependable. Should a first specimen show negative or weakly positive agglutination, taking of subsequent specimens will frequently result in strongly positive agglutination reports.

A positive intradermal test with brucella antigen signifies exposure to brucella infection in the recent or remote past. Simpson [6] advises against overemphasizing the diagnostic significance of this test, stating that the intradermal test when positive "does not mean that the symptoms from which the patient is suffering at the time are necessarily due to brucellosis."

Findings of the opsonocytophagic test are probably most dependable when observed soon after onset of symptoms. Results need to be interpreted with caution.

Economically and from a health standpoint, brucellosis is one of the most important diseases transmissible from animals to man. Measures for eradication of Bang's disease need to be pursued vigorously in coöperation with veterinarians, the Federal Bureau of Animal Industry, and state departments of agriculture.

Use of none but carefully pasteurized dairy products and enforcement by cities and communities of the *Standard Milk Ordinance* as recommended by the U. S. Public Health Service, afford the best assurance against the possibility of milk-borne disease.

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Some Epidemiological Aspects of Tuberculosis Determined by Analysis of Sanatorium Records*

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IN September, 1938, the Massachusetts State Department of Health, with the coöperation of the Middlesex County Sanatorium and the financial support of the Commonwealth Fund, called on the writer to make a statistical analysis of the clinic records of the county sanatorium. The purpose of this study was to throw more light upon the epidemiology of tuberculosis in order that methods of disease control could be better evaluated.

SOURCE OF CLINICAL MATERIAL

Middlesex County is the third largest county in Massachusetts, comprising an area of 844 square miles. The tuberculosis hospital district excludes the cities of Cambridge and Lowell. There are 43 towns and 9 cities in the hospital district, with a population of 759,122 (1940 census), of which approximately 14 per cent is foreign born. The area served by the hospital is chiefly residential, many of the white-collar workers commuting to Boston. The chief industries include textile mills, shoe manufacture, mechanical assembly plants, tanneries, oil refineries, and a large granite quarry in one small town. At the time of this study (1938–1940) the tuberculosis mortality rate was approximately 28 per 100,000.

The study is based on a total of 10,929 patients examined in the sanatorium out-patient department during the years 1931–1938 inclusive. There were 1,220 active cases of tuberculosis diagnosed during the period, representing a gross morbidity of 11.1 per cent. These patients were referred to the sanatorium by (1) private physicians, (2) sanatorium social service because of known familial contact, (3) local boards of health because of contact with a reported case, (4) school physicians because of positive tuberculin reaction and suspicious physical findings, (5) welfare health associations because of so-called "indices" of tuberculosis, i.e., underweight, poor housing conditions, etc. In keeping with the best practices of an out-patient tuberculosis clinic, extensive records were maintained and every effort was made to examine and follow up all contacts. Each medical record includes a clinical history of the patient and his family, summary of physical examination, results of tuberculin test, x-ray interpretation, and laboratory findings.

METHOD OF STUDY

The value of a clinic group as a concentrated source of medical information

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is acknowledged by the medical profession at large. It is admitted too that conclusions drawn from a study of a clinic population are limited because of certain inherent fallacies. That an out-patient department, functioning as an aid to diagnosis, is associated with a select group of patients is readily understood when one considers the various economic, sociological, and medical factors involved. In the present study an attempt was made to control the many variables that are known to influence the morbidity in a clinic population. For purposes of comparison strict adherence to definition was imperative.

Data on clinic records were coded, transcribed to punch cards, tabulated, and analyzed for statistical significance. Patients diagnosed "negative for tuberculosis" include persons whose chest roentgenograms were either negative or demonstrated evidence of upper lobe fibrosis and calcification, healed basal or apical pleuritis, calcified hilar glands, or the presence of a solitary parenchymal tubercle. Dependent on the subject of study, the many classifications of patients were studied singularly or grouped in broader categories. The method of grouping is defined in each of the parts of the present study.

I. STUDY OF TOTAL OUT-PATIENT POPULATION

Of the total patients examined, 5,334 gave a history of intimate contact with a case sharing the same household environment at the time of examination or at some previous time. Tuberculosis morbidity in contacts was determined in relation to the family aggregate by classification according to sex and familial relationship to source case. More comparable rates were obtained by the exclusion of patients under 15 since this age group did not include consorts. The age-adjusted morbidity rates are shown in Chart I. The rates were obtained by the "direct method," employing the formula $\Sigma P_1 \ldots\ldots k \cdot r_1 \ldots\ldots k$ in which P represents the age-specific population of the total contact population examined and r the age-specific rates by sex and relationship to source case. Of note is the comparatively low rate in consorts, and the higher morbidity in females in all classifications other than patients exposed to "father."

From a review of the individual case records it was apparent that 805 contacts reporting a tuberculosis death in the family household 1 to 10 years prior to examination were examined for reasons other than contact; in the 4,529 remaining contacts, however, examination was indicated chiefly because of contact. It was believed that analysis of the latter group would yield more comparable rates since the many factors, illness particularly, associated with a clinic population were thereby minimized.

Among the 4,529 contacts there were discovered 323 cases of tuberculosis, 223 among the 2,521 females and 100 among the 2,008 males. This is a significantly higher morbidity in females.

The age-specific tuberculosis morbidity is shown in Table. 1. For comparison similar data are given for the 4,955

CHART I

COMPARATIVE (AGE-ADJUSTED) MORBIDITY IN CONTACTS ACCORDING TO SEX AND FAMILIAL RELATIONSHIP TO SOURCE CASE (AGES 15 & ABOVE)

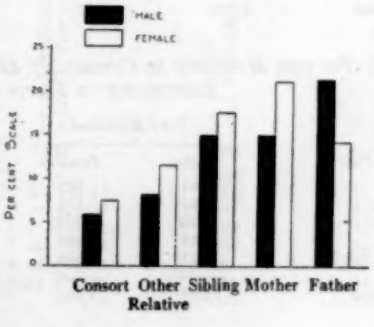

CHART IIA

MORBIDITY IN CONTACTS OF LIVING HOUSEHOLD CASES

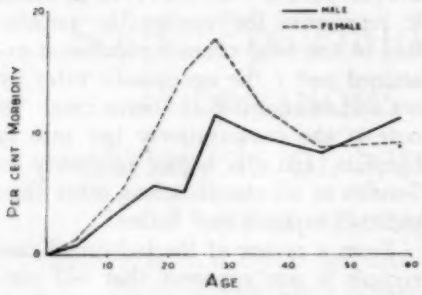

CHART IIB

MORBIDITY IN PATIENTS WITH NO HISTORY OF CONTACT

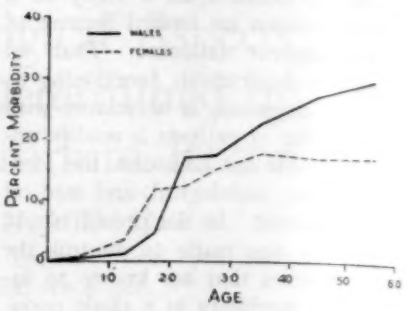

TABLE 1

Morbidity by Contact, Sex and Age

	(A) Contacts of Living Household Cases						*(B) Negative History of Contact*					
	Males			*Females*			*Males*			*Females*		
Age	*No. Ex'd*	*TB*	*%TB*	*No. Ex'd*	*TB*	*%TB*	*No. Ex'd*	*TB*	*%TB*	*No. Ex'd*	*TB*	*%TB*
0- 9	624	5	0.80	578	7	1.2	383	1	0.26	335	2	0.60
10–14	355	13	3.7	380	21	5.5	279	3	1.1	296	10	3.4
15–19	275	15	5.5	313	31	9.9	264	13	4.9	280	33	11.8
20–24	180	9	5.0	274	42	15.0	241	41	17.0	399	49	12.3
25–29	166	19	11.4	268	47	17.5	249	43	17.3	387	58	15.0
30–39	199	19	9.6	354	43	12.1	387	88	22.7	507	90	17.8
40–49	119	10	8.4	202	18	8.9	303	82	27.1	247	42	17.0
50+	90	10	11.1	152	14	9.1	249	75	30.1	149	26	17.4
Total	2,008	100	5.0	2,521	223	8.8	2,355	346	14.8	2,600	310	11.9

TABLE 2

A. Morbidity by Sex and Relationship to Source Case

	Males			*Females*		
Source Case	*Total Ex'd*	*No. TB*	*%TB*	*Total Ex'd*	*No. TB*	*%TB*
Father	471	27	5.7	490	31	6.3
Mother	420	8	1.9	438	28	6.4
Consort	220	17	7.7	359	31	8.6
Sibling	463	25	5.4	650	87	13.4
Other	434	23	5.3	584	46	7.4
Total	2,008	100	5.0	2,521	223	8.8

B. Per cent Morbidity in Contacts of Living Household Cases According to Sex and Relationship to Source Case (Ages 15 and Over)

	Total Examined		*Crude Rate*		*Age-adjusted Rate*	
Source Case	*Males*	*Females*	*Males*	*Females*	*Males*	*Females*
Father	165	182	10.3	12.6	11.2	10.1
Mother	91	125	5.5	13.6	6.2	15.9
Consort	220	359	7.7	8.6	4.8	6.3
Sibling	316	498	6.6	16.3	6.6	15.3
Other relative	237	399	9.3	11.3	7.1	11.3
Total	1,029	1,263	8.0	15.6		

patients with no known exposure and who were examined for reasons other than contact. In Table 1 and Chart II-A it is noted that the morbidity in females under 50 is consistently higher than that in males of similar age. In patients with a negative history of contact (Table 1, Chart II-B), among those under 20, the morbidity is higher in females; over 20 the morbidity rate is significantly higher in males, as measured by the chi-square test for statistical significance.

The morbidity according to sex and relationship to source is summarized in Table 2. Of note is the higher morbidity in females, particularly those exposed to a "sibling" and, dependent on age, the comparatively low morbidity in consorts.

II. THE DEVELOPMENT OF TUBERCULOSIS AS OBSERVED IN THE OUT-PATIENT CLINIC

In Part I it was noted that 1,220 cases of tuberculosis were diagnosed in 10,929 patients. Of the remaining 9,709 patients 268 gave evidence of non-tuberculous pulmonary disease on x-ray, and were referred to general hospitals for therapy. There were 9,441 persons whose chest roentgenograms on initial examination were either negative or demonstrated evidence of healed specific or nonspecific pulmonary infection. This group constitutes the patients in whom the development of tuberculosis was observed. A patient who was seen to develop the disease is defined as a "breakdown."

It is obvious that a number of factors played a part in determining the frequency of reëxamination and the duration of follow-up, i.e., coöperation of the patient, age, contact, tuberculin reaction, and other clinical data referable to respiratory infection. The object of this administrative procedure was to diagnose tuberculosis in its earliest stages in a clinic group which was thought highly susceptible to the disease.

Of the total negative population, 4,076 patients were observed for a period of at least 1 year. The rate of development of tuberculosis (breakdown rate) is presented in Table 3, employing a "modified life table method."[1] The duration of follow-up is expressed to the nearest year. The cumulative per cent breakdown for a period of 6–7 years of observation is $3.31 \pm .61$; 54 of the 65 breakdowns occurred within the first 2 years. This rate is based on the rate at which the patients were dropped from the clinic and is therefore adjusted for duration of follow-up. An estimate of the

TABLE 3

Per cent Breakdowns in Patients Followed for at Least One Year

Year of Follow-up (1)	*No. at Risk* (2)	*No. of Breakdowns in Specific Year* (3)	*Per cent Breakdowns in Specific Year* (4)	*No. Dropped (Incl. Breakdowns)* (5)	*Cumulative % Breakdowns* (6)
Initial exam.	9,441	—	—	5,156	—
1	4,076	33	0.81 ± 0.14	1,717	0.81 ± 0.14
2	2,359	21	0.89 ± 0.19	902	1.70 ± 0.24
3	1,457	3	0.21 ± 0.12	559	1.91 ± 0.27
4	898	4	0.44 ± 0.22	384	2.35 ± 0.35
5	514	3	0.58 ± 0.34	251	2.93 ± 0.47
6	263	1	0.38 ± 0.38	189	3.31 ± 0.61
7	74	—	—	—	3.31 ± 0.61

TABLE 4

Breakdown Rates According to Age Based on Total Years of Observation

Age Group	Total Years of Observation	No. of Breakdowns	Per cent Breakdowns
0–14	5,364	17	0.32 ± 0.08
15–19	1,439	25	1.76 ± 0.36
20–24	788	8	1.02 ± 0.36
25+	2,050	15	0.73 ± 0.19
Total	9,641	65	0.68 ± 0.08

TABLE 5

Breakdown Rates According to Sex and Age Based on Total Years of Observation

	Males			Females		
		Breakdowns			Breakdowns	
Age Group	Years of Observation	No.	Per cent	Years of Observation	No.	Per cent
0–14	2,614	6	0.23 ± 0.09	2,750	11	0.41 ± 0.01
15–19	658	8	1.22 ± 0.43	781	17	2.18 ± 0.53
20–24	283	3	1.06 ± 0.60	505	5	0.98 ± 0.43
25+	723	5	0.69 ± 0.31	1,327	10	0.75 ± 0.24
Total	4,278	22	0.51 ± 0.11	5,363	43	0.80 ± 0.12

standard deviation of a cumulative rate was derived by the formula $\sigma^2 = \sigma_1^2 + \sigma_2^2 \ldots\ldots\ldots + \sigma_n^2$, i.e., the $(S.D.)^2$ of the rate equals the $(S.D.)^2$ of the year-specific rates. By the same method, statistical comparison of the cumulative morbidity by sex for a like period of observation yields a higher rate in females than in males, 4.66 ± 1.1 cf 1.71 ± .38 per cent.

Because of the small number of breakdowns it was thought that the determination of breakdown rates according to the total number of years of observation (person-years) rather than to the total persons followed would offer a better method for comparative purposes. In this statistical procedure it is assumed that the rate of dropping-out of clinical observation is the same for the various classifications of persons (by age, sex, and contact) studied. The 4,076 patients represent a total of 9,641 person-years of observation; the rate of breakdown for the entire group being 0.68 ± .08 per 100 years. The age-specific rates are shown in Table 4.

The breakdown rates according to sex are summarized in Table 5. Under 20 the rate in females is almost twice that in males ($\chi^2 = 6.14$, $p = .014$); in older ages the differences between the sexes are not statistically different. Based on total number of years of observation, however, the rate in females is significantly higher than that in males.

That the risk of breakdown varies with the degree of exposure is shown in Table 6.

TABLE 6

Breakdown Rates per 100 Person-Years by Exposure

Exposure	Crude	Age-Adjusted
Denied	.434 ± .15	.479
Extra-familial	.570 ± .23	.577
Within household	.756 ± .11	.769

It is of interest to compare the data in Table 4 with Table 7. In Table 7 the age-specific population may be looked upon as so many years of observation, the new cases as so many breakdowns. In this sense the data may be considered comparable with Table 4. In the age groups 0–14 and 15–19 it is of note that the rates in the

TABLE 7

New Cases of Pulmonary Tuberculosis Reported in Massachusetts in 1937

Age Group	Total Population	New Cases	$\frac{\text{Cases}}{\text{Population}} \times 100$
0–14	1,049,461	180	0.17 ± 0.01
15–19	375,075	250	0.67 ± 0.04
20–24	249,072	406	1.16 ± 0.06
25+	2,528,323	2,392	0.95 ± 0.02
Unknown		303	
Total	4,201,931	3,531	0.82 ± 0.01

clinic population are approximately from two to two and one-half times that of the general population. These differences are statistically significant. A review of the age distribution of the two populations reveals striking differences. For this reason the morbidity rate of the clinic population was adjusted to the age distribution of the state. By so doing the rate (.743 ± .09) obtained in the sanatorium group tends to approximate the rate (.821 ± .01) in the general population.

III. STUDY OF COMPLETE FAMILIES

The contact data in Part I were based on family history from individual records and not related to results of examination of the entire family household. To test the validity of conclusions that could be drawn from Part I a more objective approach to the epidemiology of tuberculosis was made by a study of families in which all members were examined. By this method it was believed that such factors as cause for or failure of examination would be subject to better control.

This study comprises 479 families in which all living members of the household were examined either at the county sanatorium or another institution within the state. In each family there was at least 1 case of tuberculosis, and family history revealed no known death from the disease at the time of examination. These families represented 1,884 living household members. The age-specific tuberculosis morbidity is noted in Table 8.

TABLE 8

Age-Specific Morbidity

Age	Total Population	Primary Cases on Initial Exam.	Primary Cases on Subsequent Exam.	No. Contacts Examined	Contacts with TB on Initial Exam.	Per cent Contacts with TB on Initial Exam.	No. Contacts Not on Initial Exam.	No. Breakdowns	Per cent Breakdowns in Initially Negative Contacts	Total Contacts with TB	Per cent Morbidity in Total Contacts
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0– 9	475	3	..	472	7	1.5	465	2	0.4	9	1.9
10–14	226	8	..	218	10	4.6	208	5	2.4	15	6.9
15–19	160	18	2	140	9	6.4	131	8	6.1	17	12.1
20–24	141	44	1	96	16	16.7	80	1	1.2	17	17.7
25–29	182	78	..	104	10	9.6	94	3	3.2	13	12.5
30–39	320	135	1	184	15	8.2	169	2	1.2	17	9.2
40–49	238	108	..	130	7	5.4	123	2	1.6	9	6.9
50–59	78	34	..	44	..	...	44	..	...	..	...
60–69	26	13	..	13	..	...	13	..	...	..	..
70+	6	2	..	4	..	...	4	..	...	..	...
N.S.	32	32	..	..	..	...	..	..	...	..	...
Total	1,884	475	4	1,405	74	5.3	1,331	23	1.7	97	6.9

The primary case is the member of the household with the most advanced stage of pulmonary tuberculosis; in families with more than one member with the same stage of disease, the oldest was designated as the primary case. The exact ages of 32 patients with advanced disease were unknown; approximate ages, however, were estimated by a study of their relationship to other members of the household. Columns (3) and (8) of the same table represent the number of cases (breakdowns, v.s.) diagnosed by serial x-ray examination. In 4 families (col. 3) the entire household was examined because a member was seen to develop the disease on follow-up. In these cases the reason for repeated examination was clinical, i.e., underweight, tuberculin sensitivity, and chronic respiratory ailments.

A single examination of the 1,405 contacts revealed a tuberculosis morbidity of 5.3 per cent, the rate in the 20–24 year age group being three times that of the group as a whole. In column (9) it is noted that 1.7 per cent of 1,331 contacts essentially negative on initial examination were observed to develop the disease by serial roentgenography. It is significant to note that contacts 15–19 years of age revealed a morbidity on subsequent examination comparable to that on initial examination. It is to be emphasized that, in comparing the breakdown rates according to age, it is assumed that the period of observation is comparable in all age groups. The total morbidity in contacts as determined by both initial and subsequent examinations is 6.9 per cent.

Morbidity by sex is shown in Table 9 and Chart III. For the total house-

CHART III

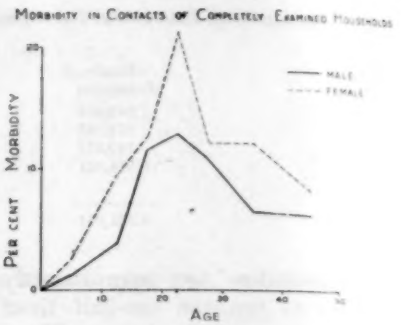

TABLE 9

Morbidity by Sex, Age and Contact

Age	Males						Females					
	Total Population	*No. Primary Cases*	*Per cent Total Primary Cases*	*No. Contacts Examined*	*No. Contacts with TB*	*Per cent Morbidity among Contacts*	*Total Population*	*No. Primary Cases*	*Per cent Total Primary Cases*	*No. Contacts Examined*	*No. Contacts with TB*	*Per cent Morbidity among Contacts*
0– 9	238	1	0.37	237	3	1.2	237	2	0.97	235	6	2.6
10–14	104	2	0.39	102	4	3.9	122	6	2.9	116	11	9.5
15–19	71	2	0.74	69	8	11.6	89	18	8.7	71	9	12.7
20–24	57	18	6.6	39	5	12.8	84	27	13.1	57	12	21.0
25–29	75	29	10.7	46	6	10.9	107	49	23.8	58	7	12.1
30–39	161	84	30.9	77	4	6.5	159	52	25.2	107	13	12.1
40–49	122	73	26.8	49	4	8.2	116	35	17.0	81	5	6.2
50–59	42	29	10.7	13	..	...	36	5	2.4	31	..	...
60–69	15	8	2.9	7	..	...	11	5	...	6	..	...
70+	6	2	0.72	4	..	...	..	..	3.4	..	..	...
Not stated	25	25	9.2	..	..	...	7	7	...	..	..	...
Total	916	273	100.*	643	34	5.3	968	206	100.*	762	63	8.3

* Approximate

hold population under 30 years of age a significantly higher morbidity rate is obtained in females; above this age a higher morbidity is obtained in males. For the total contacts of primary cases a significantly higher attack rate is found in females as compared with males, i.e., 8.3 cf 5.3 per cent. These rates are similar to those obtained in the total sanatorium population exposed to living household cases, i.e., 8.8 cf 5.0 per cent (v.s. Table 1).

IV. ADDITIONAL FACTORS INFLUENCING MORBIDITY

A total of 65 breakdowns occurred in 60 families; in 5 families 2 breakdowns occurred simultaneously. Ten breakdowns showed x-ray evidence of hilar calcification. The results of the Mantoux test at the time of initial examination were as follows:

Positive to .01 mg. OT	49
Positive to 1 mg. OT	5
Negative to both doses	5
Negative to .01 mg. OT, 1 mg. OT not given	5
No test	1
Total	65

Of 20 patients who had been previously tested in the Chadwick Clinics (see below), 5 were reported positive and 15 negative to the Von Pirquet test.

In order to determine with the material available what factors about the patient and family influenced morbidity subsequent to initial examination, two groups of families were compared: (1) those families referred to as "breakdown" families in which some member developed tuberculosis while under observation, and (2) a random sample of families in which no "breakdown" was observed. Of 208 contacts of "breakdown" families, 52 had been previously tested with tuberculin in the Chadwick Clinics sometime prior to admission to the sanatorium outpatient clinic. These tests were employed routinely in the school population as a screening method in a case finding program. It is to be emphasized that the data accumulated in the Chadwick Clinics are independent of the present study. That is, the data of each patient examined in the sanatorium clinic were coded according to family group, and reference was then made to the Chadwick Clinic records to determine whether results of routine tuberculin tests according to Table 10 were available. Of the control group of families, 67 of a total of 608 contacts studied had been previously tested. The average age at the time of the school test was 11 years, and that at the time of examination in the OPD clinic 15½ years.

The tuberculin reaction in the Chadwick Clinics among these 119 individuals is presented in Table 10. The per cent infected at the time of the school test is lower in the "breakdown" families as compared with the control group; the difference is greater than would be expected by chance alone ($\chi^2 = 5.10$).

The duration of illness of the primary case (see Part III) was employed as an index of the duration of exposure of other household members. The duration of exposure was measurable in 49

TABLE 10

Results of School Tests with Tuberculin According to Family Group

Tuberculin Reaction	Breakdown		Non-breakdown		Total	
	No.	Per cent	No	Per cent	No.	Per cent
Positive	15	28.9	33	49.4	48	40.3
Negative	37	71.1	34	50.6	71	59.7
Total	52	100	67	100	119	100

TABLE 11

Duration of Exposure by Family Group

Duration of Contact	Families with Breakdown		Families without Breakdown		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Less than 1 year	30	61.2	71	43.6	101	47.6
Greater than 1 year	19	38.7	92	56.4	111	52.4
Total	49	100	163	100	212	100

of the 60 "breakdown" families. These families were compared with a random sample of 163 families in which no breakdown occurred. The mean duration of exposure (expressed in months) of contacts was found to be 20.53 ± 1.26 in "breakdown" families as opposed to 31.97 ± 1.22 in the "control" families. The difference is statistically significant. These results are confirmed by a comparison of whole families. It was thought that the influence of size of family on the mean duration of exposure per person was thereby eliminated. A summary of the findings as expressed in Table 11 reveals a shorter duration of contact in "breakdown" families ($\chi^2 = 4.63$, $p = .031$).

The low rate of breakdown reported in Part II might possibly be explained by the above results. Evidence of more recent infection as measured by the tuberculin test and duration of exposure is obtained in "breakdown" families when compared with families in which a breakdown was not observed. It would appear that, in clinic practice, by the time the tuberculous patient seeks medical aid all susceptible contacts have already developed the disease.

V. TUBERCULOSIS FATALITY

The prognosis as to life expectancy of all tuberculous patients was calculated as of the time of examination at the Middlesex Clinic. The method used for the accumulation of the data must necessarily be explained for proper interpretation of Table 12. The patients were followed for a varying number of years depending on the year of diagnosis. For example, those first examined as early as 1931 could have been followed for a maximum of 8 years, whereas those first examined in 1938 could have been followed for no more than 1 year.

Of 1,212 cases of pulmonary tuberculosis diagnosed at the sanatorium clinic, 130 gave a history of previous diagnosis and treatment. The latter patients are excluded from this part of the study. Thus, the 1,082 patients included in calculating the mortality experience represent new cases, diagnosed for the first time anywhere. Although not all patients were followed in the hospital ward or clinic, data on each patient up to the time of death or time of this study were obtained through other sources of information. Thus, if a patient refused hospitalization or dropped from the clinic against advice, additional information about the patient was sought by (1) examination of state vital statistics reports for possible cause and time of death, (2) reports by health department personnel, i.e., visiting nurses associated with the state-wide reclassification clinics, and (3) reports of diagnosis obtained from general hospitals and other sanatoria. Some patients, who were known to have moved out of the state and whose whereabouts was unknown at the time of study, are included. Their number, however, is too small to affect the results. The method used for determining the case fatality rates is essentially the same as

TABLE 12

Mortality of Cases of Tuberculosis by Stage during 8–9 Years Following Diagnosis

Year of Follow-up	Average Number at Risk	Number Dying of Other Causes during Year	Number Dying of Tuberculosis during Year	Percentage Dying of Other Causes during Yr.	Percentage Dying of Tuberculosis during Yr.	Percentage Dying of Other Causes during Preceding and Current Yr.	Percentage Dying of Tuberculosis during Preceding and Current Yr.
			Far Advanced				
1st year	515	3	127	.58	24.6	0.58	24.6
2nd year	379	1	48	.26	12.7	0.84	34.2
3rd year	282	1	20	.36	7.1	1.2	38.8
4th year	216	1	17	.46	7.9	1.7	43.7
5th year	145	..	8	...	5.5	1.7	46.8
6th year	97	..	1	...	1.0	1.7	47.3
7th year	55	..	1	...	1.8	1.7	48.2
8th year	27	..	..	...	...	1.7	48.2
9th year	1	..	..	...	...	1.7	48.2
			Moderately Advanced				
1st year	334	4	3	1.2	.90	1.2	0.90
2nd year	320	..	4	...	1.2	1.2	2.1
3rd year	279	3	9	1.1	3.9	2.3	5.9
4th year	195	2	3	1.0	1.5	3.3	7.3
5th year	142	..	3	...	2.1	3.3	9.3
6th year	92	1	2	1.1	2.2	4.3	11.3
7th year	52	..	..	...	...	4.3	11.3
8th year	26	..	..	...	...	4.3	11.3
			Minimal				
1st year	233	2	1	.86	.43	0.86	0.43
2nd year	218	2	..	.92	...	1.8	0.43
3rd year	192	1	..	.52	...	2.3	0.43
4th year	158	1	2	.63	1.27	2.9	1.7
5th year	121	..	1	...	.83	2.9	2.5
6th year	79	..	2	...	2.54	2.9	5.0
7th year	41	1	..	2.44	...	5.3	5.0
8th year	18	..	..	...	...	5.3	5.0

that recommended by Puffer, et al.[1] In the method employed by these authors it is assumed that the median duration of follow-up of patients dropped from observation during any one year is 6 months. In the present analysis, however, the length of follow-up is expressed to the nearest year.

The cumulative death rate shown in the last column of Table 12 is obtained by the life table method and represents the probability of death within a year. In far-advanced cases, for example, it is seen that the percentage dying of tuberculosis during the first and second years is 24.6 and 12.7 respectively. Thus, since 75.4 and 87.3 per cent survive the first and second years, the proportion of the original number (515) who survive through 2 years is $75.4 \times 87.3 = 65.8$ per cent. The risk of dying within the first 2 years is, as shown in the last column, $100 - 65.8 = 34.2$ per cent. Similarly, the risk of dying within 6 years is 47 per cent. In minimal and moderately advanced cases the risks of dying within 6 years are 5 and 11 per cent respectively. The cumulative death rate due to other causes was derived by the formula $r = r_1 + r_2 \ldots\ldots + r_n$. This method is applicable when the rates are small.

SUMMARY AND DISCUSSION

In this study the comparative incidence of tuberculosis according to relationship of contact to exposure case re-

veals a significantly lower rate in consorts as compared with other familial contacts. Although comparative morbidity of household contacts has not been a subject of study, a review of the literature on conjugal tuberculosis reveals interesting controversial findings and conclusions. Rowland [2] and Gaetano [3] found that tuberculosis in both husband and wife was relatively infrequent. On the other hand, a high incidence of conjugal tuberculosis is reported by Opie and McPhedran,[4] and Spector.[5]

The discrepancy in such findings is partly explained by Sopp [6] and Kayser-Petersen,[7] who showed that age was an important variable to be considered in a study of comparative morbidity, the incidence of tuberculosis in consorts of younger age groups being greater than that of older age groups. Similar results were obtained with a study of records at the Henry Phipps Institute by Paterson,[8] who also concluded that the mortality in consorts is significantly higher than would be expected among people of similar color and age in the general population of the same district. It should be noted that the present study differs from the above mentioned, in that morbidity was compared in a select group, i.e., contacts of household cases. In this specific group it is shown that the morbidity among consorts is lower than that among other household contacts.

In patients examined because of contact the morbidity rate in females is greater than that in males regardless of age and relationship of exposure cases; in patients examined for reasons other than contact the morbidity in females is greater than that in males in younger age groups, whereas the reverse is true in older age groups. In a routine roentgen survey of 12,603 inmates of the Southwestern State Hospital, Blalock, Funkhouser and Flannagan [9] found that the incidence of x-ray evidence of tuberculous disease was greater in females than males, the ratio of the attack rates being 2:1. Holm [10] concluded that in Copenhagen tuberculous morbidity is equal for both sexes up to age 30, but after 30 it is more prevalent among men; in rural districts tuberculosis is more frequent in women than in men. In a report by Hutchinson and Pope [11] on tuberculosis among school children of 79 Massachusetts cities and towns, the morbidity rate was found greater in females than males in all ages between 5 and 15 years.

In the present study it is shown that the rate of development of tuberculosis as observed in the out-patient clinic is, on the whole, comparable to that of the general population. As in the findings on initial examination, the breakdown rate is higher in females. Families in which a member was observed to develop tuberculosis showed evidence of more recent infection as measured by the results of the tuberculin test and duration of exposure when compared with a control series of families without breakdown. Horton [12] reports from his experience in the clinics of the Homer Folks Hospital that practically all cases were found at first examination. Haywood, Morriss, and Wilson [13] in a study of duration of contact emphasized the importance of short periods of contact, the 12 months period containing 44 per cent of manifest cases. Downes [14] in a study of the tuberculosis records of Cattaraugus County found that the incidence of secondary cases among family contacts was highest within the first 2 years after exposure with a rate of 3.6 per 100 persons within the first year and 1.6 within the second year after exposure to familial tuberculosis, the attack rate remaining at a low level after the second year. It would appear from such findings and those of this report that most of the cases of tuberculosis have developed before an indication for examination for

tuberculosis has been called to the attention of the clinic.

Pope, Sartwell, and Zacks,[15] in reporting the cumulative morbidity in children as observed in the Chadwick Clinics, estimated a rate of 3.19 per 100 after 7–8 years of observation, as opposed to 3.31 per 100 found in this study. The rate of breakdown by sex during the same period of observation as reported by the above authors was 1.72 for males and 4.41 for females. These rates are markedly similar to the results of the present study, i.e., 1.71 for males and 4.66 for females.

In the present study of 479 complete families, the tuberculous morbidity rate in contacts is shown to be 6.9 per cent. Jessel[16] reported a rate of 7.5 per cent in Lancashire. Similarly, Turner in Worcestershire[17] reported a rate of 8.2 per cent in contacts of tuberculous families. In this country, Haywood, Morriss, and Wilson[13] determined a morbidity rate in contacts of 8.4 per cent in a study of 156 families examined at the Gaylord Farm Sanatorium in Connecticut.

The survival time according to stage of disease is presented. The case fatality rates for the period of 6 years after initial examination are: minimal, 5 per cent, moderately advanced, 11 per cent, far-advanced, 48 per cent.

Numerous studies on death rates of tuberculosis patients following admission or discharge from sanatoria have been published since the literature was reviewed by Hilleboe[18] and Brieger.[19] Puffer, Stewart, and Gass[20, 21] reported on the mortality rates of cases of tuberculosis observed in Williamson County, Tenn., in which hospitalization facilities were not available. The mortality of tuberculous cases within 4 years following first classification was 73.1 per cent of far-advanced cases and 40.9 per cent of moderately advanced cases, as opposed to 43.7 and 7.3 per cent in the present study.

Hilleboe (v.s.), using the basic data from Brompton Hospital, England, for the years 1905–1914, estimated the percentage dead 5 years after discharge from the hospital as follows: far-advanced 79, moderately advanced 40, minimal 10. The same author[22] in presenting statistics on death rates of patients discharged from public sanatoria in Minnesota during the years 1926–1935, reported the following rates for the period of 6 years after discharge: minimal negative-sputum group, 3.6 per cent; moderately advanced group, positive sputum, 11.4 per cent; far-advanced group, positive sputum, 74.6 per cent, and negative sputum 20.9 per cent.

Gauld, et al.[23] analyzed the data on all persons discharged from the various tuberculosis sanatoria of Maryland during the years 1934–1938. Of far-advanced cases 29 per cent were dead 1 year after discharge, and 62 per cent at the end of 5 years. The mortality of those patients with moderately advanced lesions was 7 per cent within a year and 25 per cent within 5 years after discharge. Of the minimal cases, 1.5 per cent died within 1 year and approximately 6 per cent within 5 years. It is apparent to the reader that the various studies including the present report are not strictly comparable in the sense that adjustment for such factors as age, sex, and sputum findings is necessary for comparative purposes.

CONCLUSIONS

From a statistical viewpoint the behavior of tuberculosis can best be studied in an unselected group. However, the following conclusions are drawn from a study of the records of a county tuberculosis sanatorium:

1. If age and sex are kept constant the attack rate among consorts is lower than that among other household contacts.

2. Females are more susceptible to tuberculosis than males.

3. Practically all cases of tuberculosis are diagnosed on single examination; the rate of development of tuberculosis in patients negative on initial examination is the same as that of the general population.

4. A study of 479 completely examined households with at least one living case of tuberculosis reveals a total morbidity of approximately 7 per cent in contacts. Of the total examined, the morbidity rate is higher in females than males up to the age of 30 years; in contacts of primary cases the morbidity rate in females exceeds that of males in all ages.

5. The survival time of tuberculous patients is presented. The case fatality rates for 6 years following initial examination are: minimal, 5 per cent; moderately advanced, 11 per cent; far advanced, 48 per cent.

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Effect of War Upon the Minds of Children*

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THERE are several reasons why we emphasize children's programs during war. The chief reason is that children are one of the important reasons for fighting for the preservation of our country and our way of life. We are most concerned about them and their heritage.

Since the environmental factors which determine mental health or mental ill health have been established, one method of approach to the question: "What is the effect of war upon the minds of children?" is to describe briefly the environmental conditions which promote mental health and then to apply those general principles to war situations.

ESSENTIALS FOR MENTAL HEALTH

The essentials for mental health are: security and an opportunity to grow according to individual patterns. The child then develops the self confidence which leads to the acquisition of habits of responsibility and of self reliance which in turn gives him the courage to face the problem of life and make a successful adjustment in society.

The first essential for mental health is *security*. This is the feeling which is given a child from birth by parents who wanted a child and who accept him as he is, no alterations being necessary. Since the younger the child the greater this particular emotional need, most security is given by parents or parent substitutes. For the older child there is need for security from the family, the school, the community, and the nation. As indicated above, from this security boys and girls develop the self confidence that leads to self reliance in adulthood.

The second essential for mental health is to let children grow up according to their individual patterns. In order to do this, it is necessary for parents, teachers, and others to recognize the innate potentialities for growth and development in children, to determine children's individual differences, and learn what is normal for each age. Standards of behavior adapted to the age and capacity of the individual child permit a maximum growth. Environmental expectations which are beyond the youngster's grasp create confusion which results in fear and resentment. With this short description of basic principles, let us consider the influence of war upon mental health.

WAR AND MENTAL HEALTH

Since security is given largely by parents (especially in young children), their attitude and, therefore, the attitude of adults toward war is of great importance. This brings up the whole question of morale. There is no doubt but that children can "take it" if their parents can. In this connection, the first thing for all of us to do is to face the situation and admit that we are

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somewhat scared. That is nothing of which we should be ashamed. The uncertainties which surround most families together with the real dangers to which some of them will be exposed are normal stimulants of fear. Actually to be a little scared is good for it stimulates activity and, with its close ally resentment, promotes determination.

Every family should appraise the situation in which it finds itself. The aim of every individual should be directed toward the national aims and the support of the government in its determined efforts. Submission to authority is good for civilian as well as for military morale. The lessening of individual competition and the coöperation of all working together gives everyone satisfaction. On the other hand, the expression of hates which are not permissible during peacetime contributes to a lowering of personal morale during war. When individuals and families have determined the probable rôle they are to play in the war, they should make plans to meet it. The changes which may take place within the family and community should be discussed with the children in order that they may decide how to meet the eventualities as and if they arise. Children who are old enough to understand can get a great deal of benefit as well as satisfaction out of helping to devise such a program. Every member of the family should have a part to play. Having worked out procedures for possible changes in the family routine and emergencies, the children as well as the parents should carry on as nearly as possible their regular routine. It should be kept constantly in mind that children imitate their parents.

AGE DIFFERENCES

The effect of war upon children depends upon the age of the child. Even infants from birth are disturbed by anxieties of parents. The effect upon the young baby of apprehension in the mother is observed frequently by every physician.

Preschool children are most frightened by separation from their parents. In England, for example, they have shown the greatest anxiety when they were separated from their parents during blackouts. Small children have no conception of war. To them Hitler is analogous to the "bogeyman" and other supernatural symbols. Their mental health depends upon the security they feel in their parents and home. When father is out of the home for long hours because of work or being away from home, their security depends upon mother's ability to take charge and make them feel that everything is all right. Those mothers whom I have observed are doing a remarkably fine job of managing their families without the aid of their husbands.

PROBLEMS IN DEFENSE INDUSTRIAL AREAS

There are a great many disruptions of homes, however, which are causing serious harm to the physical and mental health of children. I refer to those families in which fathers are away and the mothers are working in war factories. The children of all ages are left home without adequate supervision or general care. Mothers go home after 8 hours of work, 6 days a week, and often do the family washing and heavy housework. They are tired, and often cannot help being irritable toward their children. The extent of the problem is illustrated by one war plant in the middle west which employs about 1,400 women. This plant runs three shifts, 7 days a week, each employee having one day off each week. Fifty per cent of these workers are married women and a great many have from one to seven children. They have been found

to be reliable, efficient employees except that they often become fatigued and have to leave or must quit because they can find no one to keep track of their children—not to mention the care of them. These women live in all parts of the city. There are insufficient nursery schools—and those open but 6 days a week when the factory runs 7—to care for those who work on the day shift, and no means has been devised to help those who work on the afternoon and night shifts. There has been a considerable amount of discussion of this problem but there has been no relief to the children of these workers. Unless immediate measures are taken to give them supervision and care, we can prognosticate serious physical and mental ill health for them.

The rapid growth of war factories in small towns and out in the country has created another situation which threatens the health (both physical and mental) of the children of employees in those plants. The population of many villages has increased so rapidly that the health, sanitary, recreational, and school facilities are wholly inadequate to take care of the increased load, and the communities are not financially able to meet the situation. Trailer camps and make-shift villages which have experienced a mushroom growth create other problems. Here, too, mothers often work, leaving their children to shift for themselves. Unless some means are made for providing facilities for the care of these children, we can confidently expect epidemics and mental ill health among them.

Children of school age retain their anxieties of previous years but are old enough to have a concrete conception of war. They think more about bombings and what may happen to them. Possible loss of home, less food and clothing, are of real concern to them. They are afraid that father who is in the army may be killed.

During the ages of 9 to 13 years there are fewer serious anxieties, according to the experience of the British, than in younger or older children. During this period youngsters like to dramatize events in life and thereby act out their feelings. In this way, a part of their tension is relieved. Although they are scared, the idea of war appeals to them.

The adolescents carry the anxieties of childhood together with the problems peculiar to their age. Everyone will agree that the hardships of war fall heavily upon youth. They are expected to grow up more rapidly, often assume responsibilities beyond their level of growth; their education, vocation, marriage and start in life must be postponed for an indefinite period. This change is not entirely on the red side of the ledger, however. For those adolescents who are sufficiently mature, the war situation offers an opportunity to develop their abilities and make a more successful adjustment than during peacetimes. Nearly all of them, however, are faced with attitudes both within and without the home, which are opposite to the kind they faced during childhood. I refer to the fact that for twenty-five years we have been teaching our children that war is wrong and other fairy book stories which are contrary to the hard facts of life. Their ability to adjust successfully to our rapidly changing philosophy of life is one reason for saying that democracy works and is a glowing tribute to American parents and youth.

Uncertainty always stimulates anxiety. Youths hear would-be prophets predict national bankruptcy, depression, and the end of opportunity in America. These reports are disturbing and contribute to undesirable propaganda and lowered morale. As they grow up, children and youth need security in their community, church, and nation. The pessimistic remarks,

especially of those in high places make far-reaching impressions on their minds.

CHANGES IN BEHAVIOR

Having briefly described some of the conditions which surround children at the present time, and indicated the reasons for anxieties stimulated by war, we are next interested in the behavior changes which may be expected. They vary with the age of the child. Infants respond to restlessness, crying, and unhappiness. Preschool children may become negativistic and evasive, may stammer, have enuresis, and night terrors or they may become irritable and disobedient. I saw a 4 year old girl recently who developed a poor appetite and became very disobedient after her mother returned from visiting the little girl's father who was in the army. School children may react to their anxieties by expressing their fears and demanding frequent reassurance. Other signs of their insecurities may be poor school work, compulsive stealing and vandalism. Sometimes insecure, frightened children become tyrants at home and are examples of the popular misconception of "spoiled children." Adolescents react to their symptoms by neurotic complaints such as abdominal distress, rapid heart rate and weakness, or by truancy and delinquency, the most serious being sex delinquency.

SPECIFIC MEANS OF HELPING CHILDREN

I have already indicated the general measures which may be taken to minimize the effects of war upon the minds of children. Let us now consider some of the specific means of aiding them. Adults and children can be given a great deal of help and their anxieties can be lessened by adjusting their emotional needs to the conditions of war. The wave of determination to devote our all-out efforts to win this war, and the certainty in our minds that it will be won, together with the unity of effort which has developed in the last 10 months, has done much to improve general and individual morale and lessen anxieties in adults.

With higher parental morale the morale of children is increased. Young children can be relieved of anxieties in proportion to the security they feel in their parents. Every effort should be made to keep them with their parents. It is especially important during blackouts because they feel safe only when they are very close to them. When father is out of the home, mother can give adequate security if a well organized and well thought-out plan is made wherein everyone knows what to do in case of emergency, and if the children are made to feel that their mother will be there to see that everything is all right.

Children can get a great deal of satisfaction out of developing a plan for an air raid shelter and they learn how to play and do things together as well as indulge in constructive play which aims to help others when they help in the preparation of a bomb shelter. In the absence of both parents children can be made to feel secure by a mother substitute who is capable and who knows exactly what to do in case of an emergency.

"If you want to encourage a child to be brave," says Glover in a recent book, "you do not begin by telling him that he is silly; you encourage his sense of responsibility, give him something sensible and useful to do, show him a good example, tell him the truth, admit your errors and be friendly with him. He will do the rest himself." It is better not to indulge in a large number of drills; children do best if given a few simple directions and enough responsibility to feel that they play an important part in meeting an emergency.

Children of school age get additional relief from anxiety through free expression of thought in play. They can-

not be kept from hearing war news, and enjoy it too much to be deprived of it even if it were possible to do so. Parents, therefore, should discuss the war with them, help them to reject malicious propaganda and unfounded rumors, and assure them that the outcome will be victory for us. It is a good time to let them develop pride in our country and assurance of a better future. War games provide an excellent emotional outlet and should be encouraged. Boys and girls like to feel important and to believe they are a part of the victory program. This expression may be fostered by buying stamps, collecting scrap, messenger work, and helping the Red Cross. It is important for them to do these things only during their spare time and while the home is running on as near to a normal schedule as possible. Surely, there is no reason for shortening the school year or dispensing with any part of the curriculum.

PROBLEMS OF ADOLESCENTS

The adolescent may be given moral support and helped by giving him emotional outlets in terms of his emotional needs. At this age, boys and girls require security in their parents, their homes, the community, the church, and the nation, as well as praise for their efforts and opportunity compatible with their abilities and degree of emotional maturity.

Young men and women should feel that there is something they can do well, that there is a place in society for them now and that there will be an important place for them after the war is won. Since the military services cannot give every individual an opportunity to develop his particular abilities, it is important that there should be opportunities for them when they return to civilian life. When their emotional needs (feeling of expertness and knowledge of their importance) are supplied, young people develop the self confidence that gives them the courage to meet difficult situations and make an adjustment to them.

The importance of training young men and young women is especially great in the mechanized warfare of the present time. Educational facilities for both vocational and professional training are useful for mental health as well as for the war effort. As a part of their training youths can be made to realize that they are not only important to their country, but that they are an important part of their country. American history, if properly taught, paves the way for the development and rationalization of love of country, and greater security by realizing more fully that this is *my* country and that there is an important place in it for *me*. American history could not be revised to conform more closely to the interests and emotional needs of the adolescent mind.

To young men and women, independence and adventure are of utmost importance. It should be pointed out to them that it was rebels who, seeking opportunity and adventure, founded and developed this country. They should be brought to recognize that their first ancestors in this country, whether they came over one or ten generations ago, felt the same way about life that they feel today. They can be made to feel that the days of adventure will not be over after the war. The land frontier, it is true, is gone, but the frontiers of science, with the possibilities of invention which are just beginning to be recognized, offer far greater opportunities for progress in the future than our forefathers dreamed possible.

Adolescents can be made to understand that this is the best country in the world for the expression of independence, opportunities for adventure, and real hope for achievement. The

basic principle of democracy is that individuals are important and each one has a voice in government, business and social life. In these ways young people can identify themselves with the past and be assured of the future, even though economic conditions may be serious. The war will only temporarily interfere with their life program. In the near future they will inherit the country because they will take their parents' place in the world. This, then, becomes *their* home and *their* country. And when they take over we can rest assured that they will do as good a job as we have done.

We can be of further help to youth by resisting the demoralizing propaganda of those depressed and discouraged individuals who not only see the end of opportunity in this country but also the destruction of civilization and nothing to live for if our wealth is conscripted.

Finally, well developed and intelligently controlled and properly coördinated youth organizations are of great help. Recreational centers, scout troops, church groups, Y.M.C.A. and Y.W.C.A. schools, any well managed organization that gives boys and girls and young men and women wholesome emotional outlets and constructive social activities will prevent personal and moral deterioration that is threatened by war. There is a pressing need for coördinated youth programs in every community.

Losses of Vitamins Which May Occur During the Cooking of Dehydrated Vegetables*†

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BECAUSE dehydrated vegetables are now being used in large amounts by our armed forces and in increasing amounts by civilians at home and abroad, it is important to know the nutritive value of these vegetables at the time they are actually consumed. Directions given at present for cooking dehydrated vegetables vary from starting them in cold water to starting them in boiling water; from no refreshing ‡ to refreshing them overnight, and from cooking them in small amounts of water to cooking them in as large amounts as 8 quarts of water to 1 pound of vegetable.

The work reported in this paper was part of a study of the nutritive value and palatability of dehydrated vegetables carried out coöperatively with the U. S. Bureau of Home Economics, the University of California, and the University of Texas. The purpose of the particular study herein presented was to determine some of the factors which affect the losses of vitamins from commercially dehydrated vegetables during cooking procedures. Four commercially dehydrated vegetables—beets, cabbage, potatoes, and rutabagas—were cooked in family and in quantity amounts.

In cooking family amounts the object was to determine losses (1) of thiamin when the vegetables were (a) started in boiling water (98° C.) and started in cold water (20° C.), (b) cooked without and with refreshing, and (c) cooked in varying amounts of water; (2) of ascorbic acid from the cabbage when it was (a) put in boiling water (98° C.), and in cold water (20° C.), (b) cooked without and with refreshing, and (c) cooked in varying amounts of water; (3) of carotene from commercially dehydrated rutabagas cooked in varying amounts of water.

In cooking quantity amounts the object was to determine the losses of thiamin during steaming. Because it is common procedure to "hold" such

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‡ "Refreshing" is the term generally applied to the preliminary soaking of dehydrated products.

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vegetables before serving them, the losses of thiamin due to holding the steamed vegetables for 1 hour in a steam-heated warming oven were determined.

METHOD

History of vegetables—The history of these vegetables as well as the losses of thiamin, carotene, and ascorbic acid from them during dehydration and storage are reported by Moyer, Wheeler, and Tressler.[1]

Family cookery procedures — Each vegetable was cooked in 50 gm. lots. This amount gave 4 to 5 servings. Covered, straight-sided 1 qt. enamel pans were used. The pans had a diameter of 5 in. and a depth of 3½ in. The rate of evaporation was controlled by a manometer which was placed between the gas outlet and the stove.[2] In each case the vegetable was brought quickly to the boiling point, and then boiled gently. Gentle boiling, or simmering, gave a more desirable texture in the cooked product than did rapid boiling.

To determine the effect of the initial temperature of the water on losses of thiamin, each vegetable was put into water at 20° C., and at 98° C., and was cooked with no preliminary soaking (Table 1). To determine the effect of refreshing, each vegetable was cooked with no preliminary soaking, and cabbage, potatoes, and rutabagas were cooked after preliminary soaking (Table 2). To determine the effect of using various amounts of water, all the vegetables were cooked in minimum amounts of water with not more than 80 gm. of water left at the end of the cooking periods, and in larger amounts of water (Table 3).

Cabbage was the only one of the four dehydrated vegetables which contained sufficient ascorbic acid for study. It was cooked with the above variables (Tables 4, 5, and 6) and the effect on the ascorbic acid content of the cabbage was determined.

Rutabagas were the only vegetable in the group which contained sufficient carotene for study. The effect of varying the amount of water (Table 7) on the retention of carotene was determined. Because the carotene content decreased quite rapidly during storage, it was not possible to determine the effect of the other cookery variables on its retention.

Quantity cookery procedures [1]—The dehydrated vegetables were steamed in 454 gm. lots. This amount gave 12 cups of beets, 28 cups of cabbage, 12 cups of potatoes and 20 cups of rutabagas. The losses occurring with these amounts were considered indicative of those which might occur in certain quantity procedures.

The vegetables were put in aluminum pans having a depth of 5½ in., a bottom diameter of 10½ in., and a top diameter of 13 in. The amounts of boiling water (Table 8) added to each vegetable were such that they resulted in a product of good texture and practically all of the cooking water was absorbed at the end of the "holding" period.

The pans of vegetables were placed in a standard type free-venting commercial steamer operating with live steam introduced directly into the cooking chamber. The steaming times are given in Table 8.

"Holding" of quantity steamed vegetables — The steamed vegetables were transferred in 454 gm. lots with a proportionate amount of cooking water to aluminum pans having a depth of 7 in., a diameter of 4½ in., and a capacity of 1¾ qts. They were then placed in an institutional steam-heated warming oven where they were held for 1 hour.

Vitamin determinations—The thiamin determinations were made by the method recommended for cereals by the

Research Corporation Committee on the Thiochrome Method [3] as adapted for vegetables by Moyer and Tressler.[4] The ascorbic acid determinations were made by the Bessey and King [5] method as modified by Mack and Tressler [6] and further modified by the use of the Waring Blendor for grinding the samples. The carotene determinations were made by the method of Zimmerman, Tressler, and Maynard.[7]

RESULTS

At the time of testing the uncooked dehydrated beets contained 1.7 micrograms of thiamin per gm., the potatoes 4.3 μg. and the cabbage and rutabagas 5.3 μg. per gm.

COOKING IN FAMILY QUANTITY

(1) THIAMIN LOSSES

The initial temperature of the cooking water made no appreciable difference in the per cent of thiamin retained (Table 1) except in the case of the potatoes. The differences, with this exception, were within experimental error, as were also the apparent increases in the thiamin content. Very little difference was observable in the per cent solution of thiamin; probably no destruction of thiamin took place.

When the vegetables were put in cold water it required from 3½ to 5 minutes for the water to come to the boil (Table 1); when they were put in boiling water, the water did not stop boiling.

Refreshing—Whether the cabbage, potatoes, and rutabagas were cooked without first refreshing them or after 30 minutes of refreshing (in the case of cabbage, 60 minute refreshing) in water at 20° C. made no appreciable difference in the retention of thiamin in the cooked vegetable (Table 2). The smaller percentage retention in the cooked potatoes than that in the other vegetables and the larger loss to the cooking water were probably due to the larger amount of water used, 550 gm. for potatoes against 400 gm. for cabbage and 300 gm. for rutabagas. There was probably no destruction of thiamin.

Amount of cooking water—As shown in Table 3, with each increase in the amount of cooking water more thiamin was dissolved from each of the four vegetables into the cooking water. By doubling the amount of water in cook-

TABLE 1

Effect of Varying the Initial Temperature of Cooking Water on the Thiamin Content of Four Dehydrated Vegetables [1]

Vegetable	Initial Temperature of Cooking Water	Time Required for the Water to Return to the Boil	Thiamin: Per Gram of Vegetable		Thiamin: Total			Retention in Vegetable	Dissolved in Cooking Water	Change
			Uncooked	Cooked	Uncooked Vegetable	Cooked Vegetable	Cooking Water			
	° C.	minutes	microgram	microgram	microgram	microgram	microgram	per cent	per cent	per cent
Beets	20°	4	1.7	0.34	85	70	17	82	20	+2
	98°	0	1.7	0.33	85	67	17	78	20	−2
Cabbage	20°	5	4.87	0.56	244	199	49	81	20	+1
	98°	0	5.08	0.63	254	216	54	85	21	+6
Potatoes	20°	3.5	4.34	1.0	217	225	..[2]	75	22	−3
	98°	0	4.23	0.97	212	228	..[2]	107	..[2]	+7
Rutabagas	20°	4	5.09	0.73	255	219	36[3]	86	14[3]	
	98°	0	4.78	0.81	239	217	34	90	14	+4

[1] Each vegetable was cooked in 50 gm. lots with no preliminary soaking. Beets were cooked in 250-gm. of water, cabbage in 400 gm., potatoes in 200 gm., and rutabagas in 300 gm. Beets were cooked 25 minutes, cabbage 10, potatoes 15, and rutabagas 30.

[2] Not sufficient cooking water to analyze.

[3] This figure includes the thiamin in the cooking water which was not analyzed and that destroyed.

TABLE 2

Effect of Refreshing Before Cooking on the Thiamin Content of Three Dehydrated Vegetables[1]

		Thiamin							
		Per Gram of Vegetable		Total			Retention in Vegetable	Dissolved in Cooking Water	Change
Vegetable	Refreshing Time	Uncooked	Cooked	Uncooked Vegetable	Cooked Vegetable	Cooking Water			
	minutes	microgram	microgram	microgram	microgram	microgram	per cent	per cent	per cent
Cabbage	none	4.87	0.56	244	199	49	81	20	+1
	30	4.87	0.53	244	189	56	77	22	−1
	60	5.08	0.60	254	216	39	85	15	0
Potatoes	none	4.34	0.41	217	102	109	47	50	−3
	30	4.34	0.38	217	108	99	50	46	−4
Rutabagas	none	5.09	0.73	255	219	..[2]	86	..[2]	
	30	4.78	0.78	239	234	25	87	10	−3

[1] Each vegetable was cooked in 50 gm. lots.
Amounts of cooking water were: cabbage, 400 gm., potatoes, 550 gm., rutabagas, 300 gm.
Temperature of water was: cabbage and rutabagas 20° C., potatoes, 20° C. and 98° C.
[2] Too little water to analyze (30 gm.).

TABLE 3

Effect of Increasing the Amount of Cooking Water on the Thiamin Content of Four Dehydrated Vegetables[1]

		Thiamin							
		Per Gram of Vegetable		Total			Retention in Vegetable	Dissolved in Cooking Water	Change
Vegetable	Amount of Cooking Water	Uncooked	Cooked	Uncooked Vegetable	Cooked Vegetable	Cooking Water			
	gm.	microgram	microgram	microgram	microgram	microgram	per cent	per cent	per cent
Beets	250	1.7	0.34	85	70	17	78	20	−2
	500	1.6	0.17	80	42	46	53	57	+10
Cabbage	400	5.08	0.63	254	216	54	85	21	+6
	700	4.87	0.34	244	126	113	52	47	−1
Potatoes	200	4.34	1.00	217	225	..[2]	104	..[2]	+4
	300	4.34	0.66	217	163	47	75	22	−3
	550	4.34	0.41	217	102	109	47	50	−3
Rutabagas	300	5.09	0.73	255	219	36[3]	86	14[3]	
	550	5.09	0.43	255	133	103	52	41	−7

[1] Each vegetable was cooked in 50 gm. lots with no refreshing.
Temperature of the water: beets, potatoes, and rutabagas, 20° C., cabbage, 98° C.
[2] Too little water to analyze (6 gm.).
[3] This figure includes the thiamin in the cooking water which was not analyzed and that destroyed.

ing beets the retention of thiamin was decreased from 78 per cent to 53 per cent, and the solution of thiamin was increased from 20 per cent to 57 per cent. In cooking cabbage, by increasing the amount of water from 400 gm. to 700 gm., the retention of thiamin was decreased from 85 to 52 per cent. In cooking potatoes, by increasing the amount of water from 200 gm. to 300 and then to 550 gm., the retention of thiamin was decreased from 104 per cent to 75 per cent and 47 per cent, respectively, and the solution to the cooking water was increased from 22 per cent with 300 gm. of water to 50 per cent with 550 gm. of water. In cooking rutabagas, by increasing the amount of water from 300 gm. to 550 gm., the retention of thiamin was decreased from 86 per cent to 52 per cent and the percentage dissolved was increased from less than 14 to 41 per cent.

(2) ASCORBIC ACID LOSSES FROM CABBAGE

Initial temperature of cooking water —The uncooked dehydrated cabbage

TABLE 4

Effect of Increasing the Initial Temperature of the Cooking Water on the Ascorbic Acid Content of Dehydrated Cabbage[1]

	Ascorbic Acid							
	Per gm. of Cabbage		Total					
Temperature of Water	Uncooked	Cooked	Uncooked Cabbage	Cooked Cabbage	Cooking Water	Retention in Cabbage	Dissolved in Cooking Water	Change
	mg.	mg.	mg.	mg.	mg.	per cent	per cent	per cent
20°	4.1	0.17	205	56.7	25.0	28	12	−60
98°	4.1	0.42	205	145.3	35.9	71	18	−11

[1] The cabbage was not blanched previous to dehydration. It was cooked in 50 gm. lots in 400 gm. water without refreshing, 10 minutes.

contained about 4 mg. of ascorbic acid per gm. When the cabbage was started to cook in boiling water rather than in cold, the retention of ascorbic acid was increased from 28 to 71 per cent (Table 4). When cold water was used, 60 per cent of the ascorbic acid was destroyed, 28 per cent remained in the cabbage. When boiling water was used only 11 per cent of the ascorbic acid was lost and 71 per cent was left in the cabbage. The cabbage has not been blanched to inactivate the enzymes before dehydration. Since it took longer to bring the cabbage and cold water to the boiling point, the enzyme system which oxidizes ascorbic acid had a longer time to act than when boiling water was used. There was very little difference at the two temperatures in the per cent found in the cooking water.

Refreshing—When the cabbage was cooked without refreshing, with 30 minutes refreshing and with 60 minutes refreshing in water at 20° C., the retention of ascorbic acid was 28 per cent, 19 per cent, and 17 per cent, respectively, and the destruction was 60 per cent, 78 per cent and 90 per cent respectively (Table 5). As noted in Table 2, the retention would have been relatively greater and the destruction relatively less if the cabbage had been put in boiling water. It is probable that some of the dissolved ascorbic acid was also destroyed upon standing, because the per cent of ascorbic acid in the cooking water decreased with the length of the refreshing period.

Amount of cooking water—With an increase of cooking water from 400 gm. to 700 gm. the retention of ascorbic acid in the cabbage was de-

TABLE 5

Effect of Refreshing in Water at 20° C. Before Cooking on the Ascorbic Acid Content of Dehydrated Cabbage[1]

	Ascorbic Acid							
	Per gm. of Cabbage		Total					
Refreshing Time	Uncooked	Cooked	Uncooked Cabbage	Cooked Cabbage	Cooking Water	Retention in Cabbage	Dissolved in Cooking Water	Change
minutes	mg.	mg.	mg.	mg.	mg.	per cent	per cent	per cent
0 [2]	4.1	0.17	205	56.7	25.0	28	12	−60
30 [3]	4.1	0.09	205	32.5	12.8	19	6	−75
60 [3]	4.1	0.04	205	14.7	6.2	7	3	−90

[1] The cabbage was not blanched previous to dehydration. It was cooked in 50 gm. lots in 400 gm. water.
[2] Cooked 10 minutes.
[3] Cooked 8 minutes.

TABLE 6

Effect of Increasing the Amount of Cooking Water on the Ascorbic Acid Content of Dehydrated Cabbage[1]

	Ascorbic Acid							
	Per gm. of Cabbage		Total					
Amount of Cooking Water	Uncooked	Cooked	Uncooked Cabbage	Cooked Cabbage	Cooking Water	Retention in Cabbage	Dissolved in Cooking Water	Change
gm.	mg.	mg.	mg.	mg.	mg.	per cent	per cent	per cent
400	4.1	0.42	205	145.3	35.9	71	18	−11
700	4.1	0.26	205	96.5	87.1	47	42	−11

[1] The unblanched dehydrated cabbage was placed directly in boiling water and cooked 10 minutes with no refreshing.

TABLE 7

Effect of Increasing the Amount of Cooking Water on the Carotene Content of Dehydrated Rutabagas[1]

	Carotene				
	Per gm. of Rutabagas		Total		
Amount of Cooking Water	Uncooked	Cooked	Uncooked Rutabagas	Cooked Rutabagas	Retention in Rutabagas
gm.	microgram	microgram	microgram	microgram	per cent
300	13.5	2.22	675	664	98
550	13.5	1.66	675	534	79

[1] Fifty gm. lots of the rutabagas were placed in cold water and cooked 30 minutes with no refreshing.
[2] Total carotenoids.

creased from 71 per cent to 47 per cent and the solution was increased from 18 per cent to 42 per cent (Table 6). The destruction was the same in each case, 11 per cent. A similar effect of increasing the amount of cooking water on ascorbic acid retention has been reported for frozen peas, spinach, cauliflower, brussels sprouts, and lima beans,[8] and for frozen broccoli.[9]

(3) CAROTENE IN RUTABAGAS

The uncooked dehydrated rutabagas at the time of testing contained 13.5 μg. of carotene * per gm.

Amount of cooking water—Increasing the amount of cooking water from 300 gm. to 550 gm. decreased the retention of carotene in the rutabagas from 98 per cent to 79 per cent (Table 7). The carotene content of the rutabagas cooked in 300 gm. and in 550 gm. of water was 2.22 μg. and 1.66 μg. per gm., respectively. Although carotene is relatively insoluble in water, the pieces of dehydrated vegetable were so small that it is possible that some of the carotene was dispersed in the water. The cooking water was used for the thiamin analyses and there was not sufficient for carotene analyses also.

QUANTITY COOKERY PROCEDURES

Steaming—The retention of thiamin during steaming was: beets 82 per cent, cabbage 88 per cent, potatoes 87 per cent, and rutabagas 74 per cent (Table 8). The remainder of the thiamin was dissolved in the small amount of water present. The thiamin content of the steamed vegetables was: beets, 0.34 μg. per gm. of vegetable, cabbage, 0.64 μg., potatoes 0.79 μg., and rutabagas 0.68 μg. (Table 8). The steamed beets and cabbage contained about the same amount of thiamin per gm. as they did when boiled in 50 gm. lots after being placed directly in boil-

* Total carotenoids

TABLE 8

Retention of Thiamin in Certain Dehydrated Vegetables during Steaming in Quantity[1]

	Thiamin							
	Per Gram of Vegetable		Total					
	Uncooked	Cooked	Uncooked Vegetable	Cooked Vegetable	Cooking Water	Retention in Vegetable	Dissolved in Cooking Water	Change
Vegetable	microgram	microgram	microgram	microgram	microgram	per cent	per cent	per cent
Beets	1.6	0.34	726	595	83	82	11	−7
Cabbage	4.63	0.64	2,102	1,848	572	88	27	+15
Potatoes	4.34	0.79	1,970	1,719	322	87	17	+4
Rutabagas	5.46	0.68	2,479	1,832	589	74	24	−2

[1] Boiling water was added to 454 gm. of dehydrated vegetables.
Amount of water: beets, 2,006 gm.; cabbage, 3,776 gm.; potatoes, 2,360 gm.; and rutabagas, 3,304 gm.
Time of cooking: beets, 25 minutes; cabbage, 10; potatoes, 15; and rutabagas, 45 minutes.

ing water with no refreshing. In the latter study the thiamin content was beets, 0.33 μg. per gm., of vegetable and cabbage 0.63 μg. The steamed potatoes contained slightly less, and the rutabagas more than in the family quantity study.

were by the best method of boiling in family amounts, that is, placed directly in boiling water and cooked without refreshing. Steaming was not a satisfactory method for cooking the cabbage and rutabagas from the standpoint of flavor and odor.

TABLE 9

Retention of Thiamin in Certain Quantity Steamed Dehydrated Vegetables during Holding One Hour in a Steam-heated Warming Oven[1]

	Thiamin							
	Per gm. of Vegetable			Total				
	Before Holding		After Holding[2]	Before Holding		After Holding[2]	Retention during Holding[2]	Change during Holding
Vegetable	Vegetable microgram	Cooking Water microgram	Vegetable microgram	Vegetable microgram	Cooking Water microgram	Vegetable microgram	per cent	per cent
Beets	0.34	0.16	0.34	154	14	176	105	+5
Cabbage	0.64	0.53	0.62	288	53	341	98	−2
Rutabagas	0.66	0.64	0.64	304	65	338	90	−8

[1] The cooked vegetables in 454 gm. lots were held in pans in an institutional steam-heated warming oven.
[2] Practically all of the cooking water was absorbed by the vegetables during holding.

Holding—When the steamed beets, cabbage, and rutabagas were held 1 hour in an institutional steam-heated warming oven they absorbed practically all of the cooking water. There was no appreciable loss of thiamin during the holding. The percentage changes (Table 9) were within experimental error.

Palatability—The vegetables were judged for appearance, color, odor, flavor, and consistency. The beets were judged excellent in all respects, the potatoes were rated as high as they

SUMMARY

1. The uncooked, commercially dehydrated beets contained 1.7 micrograms of thiamin per gm., on the dry basis, the potatoes 4.3 μg., and the cabbage and rutabagas 5.3.

2. Increasing the initial temperature of the cooking water from 20° to 98° C. made no appreciable difference in the percentage of thiamin retained in the vegetable, dissolved in the cooking water, or destroyed.

3. Cooking the vegetables without refreshing, or after 30 minutes of refreshing, and also in the case of cabbage after 60 minutes of refreshing, made no appreciable difference in the percentage of thiamin retained in the vegetable, dissolved in the cooking water, or destroyed.

4. An increase in the amount of cooking water from the minimum for each vegetable caused a very marked and consistent decrease in the amount of thiamin retained in each vegetable, and an increase in the amount dissolved in the cooking water. By doubling the amount of water in cooking beets the retention of thiamin was decreased from 78 per cent to 53 per cent, and the solution of thiamin was increased from 20 per cent to 57 per cent. By increasing the amount of water in cooking cabbage from 400 gm. to 700 gm., the retention of thiamin was decreased from 85 per cent to 52 per cent. By increasing the amount of water in cooking potatoes from 200 gm. to 300 gm., and then to 550 gm., the retention of thiamin was decreased from 104 per cent to 75 per cent and 47 per cent respectively, and the solution to the cooking water was increased from 22 per cent with 300 gm. of water to 50 per cent with 550 gm. of water. By increasing the amount of water from 300 gm. to 550 gm. in cooking rutabagas the retention of thiamin was decreased from 86 per cent to 52 per cent and the percentage solution was increased from less than 14 to 41 per cent. There was no destruction of thiamin in any case as the changes were within experimental error.

5. The uncooked, dehydrated cabbage contained about 4 gm. of ascorbic acid per gm. on the dry basis.

6. Increasing the initial temperature of the cooking water for the unblanched, dehydrated cabbage from 20° to 98° C. caused an increase in the retention of ascorbic acid in the cabbage from 28 per cent to 71 per cent, and a decrease in the destruction of ascorbic acid from 60 per cent to 11 per cent.

7. When the cabbage was cooked without refreshing, after 30 minutes of refreshing and after 60 minutes of refreshing, the retention of ascorbic acid in the cabbage was 28 per cent, 19 per cent, and 7 per cent, respectively; the destruction was 60 per cent, 78 per cent, and 90 per cent, respectively, and the solution was 12 per cent, 6 per cent, and 3 per cent, respectively.

8. When the amount of cooking water for cabbage was increased from 400 gm. to 700 gm. the retention of ascorbic acid in the cabbage was decreased from 71 per cent to 47 per cent. The solution was increased from 18 per cent to 42 per cent, and the destruction, 11 per cent, was the same.

9. When the amount of cooking water for rutabagas was increased from 400 gm. to 700 gm. the retention of carotene was decreased from 98 per cent to 79 per cent.

10. When steamed in quantity, commercially dehydrated beets, cabbage, potatoes, and rutabagas retained 82 per cent of their thiamin, 88 per cent, 87 per cent, and 74 per cent, respectively. The remainder of the thiamin was found in the small amount of cooking water present. At the end of the "holding" period this water was absorbed by the vegetables.

11. When steamed in quantity, commercially dehydrated beets, cabbage, potatoes, and rutabagas contained 0.34 μg. of thiamin per gm., 0.64 μg., 0.79 μg., and 0.68 μg., respectively. For beets and cabbage the amount is about the same as when they were placed in a small amount of boiling water and cooked without refreshing.

12. The steamed vegetables lost no appreciable amount of thiamin upon being held in a warming oven for 1 hour. Practically all of the cooking water was absorbed.

13. Steaming was a very satisfactory method for quantity cooking of dehydrated beets and potatoes from the palatability standpoint. It was not satisfactory for the so-called strong juiced vegetables, cabbage, and rutabagas.

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Epidemiology of Plague in Ecuador*

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BUBONIC plague made its entry into Ecuador through the port of Guayaquil in 1908, the official announcement of its presence being made March 7. Eskey and Miño believe that the infection came from some Peruvian port, but Long suggests, as in the case of Antofagasta, that it may have originated in plague fleas brought from India in cargoes of jute bags.

From 1908 to 1930, plague appeared annually, from December to May, that is, during the warm, rainy season known locally as winter. A total of around 8,000 cases was reported in Guayaquil for this period. The characteristics noted included (1) a cyclic recrudescence of the infection; that is, years of severe epidemics, followed by years of lesser epidemics; (2) a progressive decrease in the number of cases in each 5 year period (1908–1912, 42 per cent; 1913–1917, 35 per cent; 1918–1922, 12 per cent; 1923–1927, 8 per cent; 1928 to 1930, when the disease was eradicated, 3 per cent); and (3) a decrease in the virulence of the germ or an increase in the resistance or partial immunity of rodents, as shown by a greater number of murine cases of plague without visible (latent or bacteriologic) lesions, but which could be identified by inoculation into guinea pigs.

In 1935, Guayaquil was reinfected from the *hinterland*, and the new epidemic lasted until April, 1939. From Guayaquil the disease spread by river or maritime traffic to other Provinces of the Coast, and by land to the Sierra or Inter-Andean region.

Of the coastal Provinces, Guayas had 7,863 cases with 3,113 deaths in Guayaquil, and 321 C and 141 D cases in the other 20 infected towns; El Oro Province reported 45 C and 21 D cases in 5 localities between 1909 and 1940; the Province of Los Rios, 50 C and 19 D cases in 3 localities, 1909–1936; and Manabi, 397 C and 109 D cases in 14 localities from 1913 to 1937. It is probable that there were some 8,800 cases, 3,500 deaths in the whole group of Ecuadorian coastal Provinces from 1908 to 1939.

Official reporting was more deficient in the Inter-Andean Provinces, but the accepted figure is a total of some 2,250 cases and 1,000 deaths. The official number of known cases was 1,215, with 585 deaths, in 131 hamlets and cities of Chimborazo Province; 171 C and 66 D cases for Tungurahua; and 68 C and 33 D cases for two towns in the Province of León.

In the Southern Zone, the infection which began about 1918 persists to the present day. There were 45 known C and 31 D cases for the Province of Cañar, and 1,404 C and 811 D cases for that of Loja (1925–1940).

INTER-ANDEAN PLAGUE

Plague spread from Guayaquil to the Andean Sierra by the Guayaquil-to-

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Quito Railroad, which rises from sea level to 11,890 feet (3,609 meters, Urbina Station), to descend at its terminal (Quito) to 9,350 feet (2,778 meters). The total distance involved is about 288 miles (452 km.) and Huigra, the first mountain station, at an altitude of 3,900 feet (1,245 meters), is only about 110 miles (116 km.) from Guayaquil.

In its first period, beginning about 1909, plague invaded the railway stations through the transportation of rats and *X. cheopis* infected in Guayaquil. There were 915 C and 450 D cases in a dozen places on the railroad, the most serious epidemics being those in Alausi, 1916, 167 C and 106 D cases; Ambato, 1916, 42 C and 18 D cases, 1926, 101 C and 36 D cases; Sibambe, 1936, 96 C and 75 D cases; and Guaytacama, 1927, 53 C and 25 D cases. During this first period the epidemiology conformed to the rat-flea, rat-man type of contagion, with the exception of a notable incidence of pneumonic plague.

During the second period plague spread from the railway communities to the rural areas, and after a short time of dependence on railway plague, the rural infection became independent, with its own local epidemiological characteristics.

In general, rural Andean plague manifests itself as an apparently discrete enzoötic, this aspect being principally because of the low density of the rural population. It tends generally to have a seasonal distribution (during winter) although less so than along the coastal zone.

In the Andean zone the only province capable of maintaining plague infection is that of Chimborazo, and in that province, only the river basins. This may be because of a temperature and humidity favorable to flea activity, at least during the winter season.

These valleys are essentially agricultural, devoted to the growth of grains, fruit, potatoes, and other products of the temperate zone. The inhabitants, mostly Indians, live in either isolated huts, or grouped in small hamlets, devoid of all comforts and hygiene. Among the factors influencing the occurrence of plague, may be mentioned those of agricultural-economic origin, such as type of farming (grain), dwelling construction (stone, clay, raw); those of climatic and topographical origin (rain in relation to agriculture, average humidity and temperature, altitude, etc.); those depending on social habits (promiscuity, dwelling, wakes, lack of change of clothing, drunkenness, etc.); and those of biologic origin (rats, fleas, guinea pigs, etc.).

BIOLOGICAL FACTORS

Rodents—Various authors have accepted the statement that in general domestic rats are scarce in the Sierra, where they were introduced by the Guayaquil-Quito Railroad since 1908. This statement has not been confirmed, but instead domestic species, especially *R. rattus* and *R. alexandrinus*, have been found to be universally distributed. In towns on the railway line a high percentage of *R. norvegicus* is not uncommon (Latacunga 60 per cent; Ambato 10 per cent; Huigra 5 per cent; Quito 50 per cent). In the Loja area rats are fundamentally field-dwelling, and are not common in the cities. The percentage which rats form of the total of rats and mice (*M. musculus*) varies in different localities. In the province of Chimborazo in general this percentage is 50; and for certain cities: Latacunga, 93 per cent; Ambato, 88 per cent; Riobamba, 32 per cent; Cañar, 80 per cent; and Loja, 7 per cent.

While local authors accept the fact that plague is related to rats in Guayaquil and in the railway stations on the road to Quito, they do not agree that

this mechanism is the most usual in the rural Andean zone.

Among the wild rodents which must be mentioned as of possible importance in plague are *Phyllotis fruticolus, Oryctolagus sp* and, especially, *Cavia aperea,* the last of which is found principally in a domesticated state in close contact with the Indian population, which uses it as the principal source of meat.

Other animals—In Loja is found the weasel and in the inter-Andean region, the *zorra* o *raposa* (*Didelphis paraguayensis andina*), the susceptibility of which to experimental plague has been verified by the author. The *chucuri,* long-tailed *mustela,* or bridled mustela (*Mustela frenata aureoventris*) is important as a natural enemy of rats and because of the possibility that *X. cheopis* might accidentally be found on it. Squirrels of the Loja zone do not appear to play a part in plague.

Fleas—The following fleas have been found by previous authors on rodents, guinea pigs, and man: *X. cheopis; P. irritans; C. londinensis; Ct. canis; Ct. felis; Echidnophaga gallinacea; Hectopsylla suarezi; Leptopsylla musculi; Rhopalopsyllus cavicola* and *Tunga penetrans.*

In addition, the author has found on rats of the Loja zone, *Craneopsylla wolfhuegeli* and two species as yet unclassified; on rabbits, *Cediopsylla inequalis;* and on *Didelphis* and *mustelae,* various species at present undergoing classification.

Flea indexes—In Guayaquil *X. cheopis* is practically the only murine flea. In 1926 the *cheopis* index was 3.36 (Suarez). In 1941 it fluctuated below 1.

In the Sierra in 1926 the average *cheopis* index on *R. norvegicus* was 0.94 and on *R. rattus* and *R. alexandrinus* 1.27 (Suarez). In 1929–1930 the *cheopis* indexes were: Ambato 3.69; Alausi 0.87; Latacunga 0.96; Quito 0.3; and 0.0 in Guamote, Riobamba and Guaytacama. In 1942 *cheopis* fleas were found in Huigra, Yalancay, Gausuntos, Ceceles and Riobamba; this flea had not previously been reported in the last named city.

Lice and acari—The following have been found on rats: *P. spinulosum, L. echidninus* and *L. bacoti;* and on guinea pigs *Gyropus* sp.

DYNAMICS OF PLAGUE

We have seen that plague in Guayaquil and the railroad communities of the Andean region depended on plague-infected rats and fleas. Local authors maintain the thesis that in the rural Andean region plague does not involve the intervention of rats and rat fleas, but rather that of guinea pigs, which they consider reservoirs of the infection. Since *R. cavicola* of the guinea pig has not been recognized as a vector of plague from the guinea pig to man, and since as it has been stated, plague in guinea pig always precedes human cases, it has been supposed, without direct evidence, that the plague vector from the guinea pig to man is *P. irritans.* This, furthermore, could maintain man-to-man infection, favored by the custom of holding wakes and of distributing the clothing of the plague dead among the relatives.

A detailed study undertaken in 1940 and 1941, with regard to human fleas and fleas of domesticated guinea pigs, revealed that in 1940, of 6,143 fleas collected from humans, beds, clothing, etc., only 122 (1.67 per cent) were not *P. irritans;* 103 of these were *R. cavicola,* which came from only 2 of 54 localities studied. In 1941, of 7,225 fleas of similar origin, only 130 (1.6 per cent) were not *P. irritans,* 102 of these being *R. cavicola.*

In 76 localities in 1940, 10,116 fleas were caught on guinea pigs, including 8,309 *R. cavicola;* 718 *P. irritans;* 68 *C. londinensis,* and 991 unclassified. In

27 localities only *R. cavicola* were found.

In 1941, in 43 localities, 5,696 fleas from guinea pigs were classified. *P. irritans* were scarcely 0.53 per cent of the total (in place of 7 per cent in 1940), and in 37 localities the guinea pigs did not have any *P. irritans*. Since the study was made in the second half of 1940 and the first half of 1941, the difference might be explained by seasonal conditions and "hibernation" of *P. irritans* in guinea pigs.

From the previous data it may be gathered that *P. irritans* does not satisfactorily explain the distribution of Andean plague. Nor is it possible to attribute to it a very important epidemiological rôle when it is considered that the human flea lacks significance in plague in other countries and its capacity as a vector is, experimentally considered, limited. The author cannot accept the local theories crediting importance to this and other fleas habitually found on rats and guinea pigs. He feels that the Andean zone should be divided in two sectors with regard to the vector: first, that including up to 8,900 to 9,900 feet (2,700 to 3,000 meters) altitude, with a humidity and temperature adequate, at least seasonally, to the breeding of *X. cheopis;* and second, cold regions located above 8,800 feet, and in general all areas of an altitude above 9,900 feet in which *X. cheopis* can neither live nor breed in case they should reach them accidentally.

In the localities of the first Andean sector, plague epidemiology shows the classic form observed in rural areas; that is, epizoötic transmission from rat to rat by *X. cheopis* and human "accidents" more or less epidemic in character, involving the intervention of the same flea.

In the more elevated regions, where *X. cheopis* is absent, *C. londinensis* may play an important rôle, in view of its biologic characteristics and its preference for rat nests. In considering the lesser capacity of this flea to become infectious and to transmit plague, as contrasted with *X. cheopis*, it should be explained that plague in the high altitudes of the Andes rarely reaches man, having a sporadic character with the occurrence of a few, strictly familial, cases.

In view of the common observation of the participation of the guinea pig in plague, one might well attribute a preponderant rôle to this animal as a reservoir of the infection. However, the author does not accept anything but an accidental participation of guinea pigs in plague.

The guinea pig does not explain the origin of Andean plague, since its capacity as a reservoir is doubtful in view of its enormous susceptibility. Its correlation with plague is not perfect, and it appears rather to act as a reinforcing factor in the infection, serving as an intermediary of plague between rats and man by the liberation, at its death, of the infected fleas which it has previously caught at soil level.

Since the guinea pig is a co-dweller in the human habitation of the Sierra, it is easy to suppose that, acting as a "flea-trap," it continually collects free fleas found on the ground level. In the climatic conditions of the Sierra, the majority of contacts between rats and fleas take place in the burrows, since the range of the exterior meteorologic conditions is unfavorable to the flea and impedes the free circulation of this insect in the out-of-doors.

Most of the plague phenomena occur, therefore, in the interior of the caves, and the plague infected fleas only abandon these burrows when the external atmospheric conditions become more favorable and when the subterranean epizoötic has done away with the rat population in the nests. It is logical that under these circumstances,

the first recipient of the plague infection carried by such fleas, should be the guinea pigs which run freely above ground, and that these infected fleas should only reach man after having caused an epizoötic in, and death of the guinea pigs.

A series of factors, principally climatic and agricultural in origin, govern this epidemiology by favoring murine migrations from house to field and vice versa. On the other hand, the number of immune rats remaining after an epizoötic episode, and the number of susceptible animals added to the rat population through migration or natural increase, are important factors in the epidemiology of murine plague. It is possible that the most important reservoir of plague in the Ecuadorian Sierra may be the fleas themselves, which remain infected from one plague season to another, and through which the infection is revived when, after the harvest, a new population of susceptible rats returns to the dwellings, which happens just at the season of the year climatically most favorable to the transmission of plague from fleas to rats.

The study on which these observations are founded, included numerous other epidemiologic details which permit an explanation of the mechanism of plague in the inter-Andean zone on a basis which agrees better with the facts than theories previously advanced.

SUMMARY

Rural plague of the inter-Andean region conforms to the classic rat-flea mechanism, with changes imposed by the climatic characteristics under which the biologic activities of the rats and fleas are conducted. All the other phenomena foreign to this rat-flea mechanism should be considered simply accidental manifestations without any fundamental influence on it. However, such phenomena may on occasions appear to be predominant because they are the features most easily detected in the usual epidemiologic survey.

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Endemic Typhus Fever in Jamaica, B. W. I.

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IN spite of the fact that it is generally believed that endemic typhus fever is a common disease in the West Indies, there are few reports to substantiate this view. In fact, Zinsser [1] in a comprehensive survey of typhus fever does not indicate its presence in the Caribbean area up to 1937. The *Epidemiological Report of the League of Nations*, 1936 [2] does not record the presence of typhus fever in Jamaica, nor do the careful records of the hospitals of the United Fruit Co. indicate its presence. Typhus fever was not noted in the records of the United Fruit Co. for two successive years in Costa Rica, Cuba, and Jamaica, although the records covered the case histories of 47,000 in-patients and a half million out-patients. The health authorities in Jamaica state that typhus had not been recorded in Jamaica prior to 1941, when the cases comprising this report were noted.

The occurrence of typhus in Puerto Rico has been reported by Pons [3] who records 8 cases presenting typical clinical symptoms of endemic typhus with a positive Weil-Felix agglutination (OX_{19}). In a later paper [4] this author substantiated his previous findings by reporting a rise in agglutination titer (OX_{19}) in 20 additional cases. The author's conclusion that typhus fever was present is justified even though the agent was not isolated. These and some additional Puerto Rico cases since have been tabulated in the *Public Health Reports*, and 2 cases have been diagnosed as endemic typhus in our laboratory by the complement-fixation test.

In 1937, the first case of endemic typhus was reported from Martinique.[5] The illness was characterized by an acute onset with headache, continued fever, and a rash. The Weil-Felix agglutination (OX_{19}) titer rose from 1:300 to 1:1,000. No agent was isolated.

The present report deals with the occurrence of endemic typhus in Jamaica in 1941 and 1942. In a period of 5 months, 68 probable cases were diagnosed in natives.

The first case of typhus occurred in a native Jamaican laborer in December, 1941, the diagnosis being made by Captain T. E. Woodward. This man

complained of fever, headache, and generalized pains, and was admitted to the Army Hospital. The patient appeared moderately toxic and, outside of conjunctival injection and a few rales at the bases of the lungs, nothing abnormal was found. The temperature ranged from 100 to 105° for 14 days and fell by lysis. In spite of careful search, no rash was observed. This native had a cafe-au-lait colored skin, and a slight rash may have been missed. The Weil-Felix agglutination (OX_{19}) was 1:500 on the 8th day of illness, 1:1,000 on the 9th day, and 1:2,500 on the 12th day. Complement-fixation tests performed on specimens of serum withdrawn on the 8th and 12th day indicated that the patient's infection was of the endemic type of typhus.[7]

This case directed attention to the likely presence of murine typhus on the Island which in due time was confirmed.

In all, 68 cases were found in whom a diagnosis of endemic typhus was made, chiefly in native residents of Kingston. Most of the cases came from the thickly populated, poorer sections of the city where rats are common. Thirty-three of these cases were seen in the hospitals in Kingston. The prevailing symptoms are indicated in Table 1. The onset is usually sudden with severe headache, generalized pains, and temperature which is maintained for about 14 days when it falls by rapid lysis. Rash was only seep in 7 cases. In these cases the rash was maculopapular in character appearing on the body, arms, and legs, and was typical in character. No rash was observed in 26 cases but may have been masked in some instances by the dark skin of the natives. However, some cases, which were carefully observed, showed no rash, and hence the possibility of typhus occurring without an eruption must be considered.

TABLE 1

Summary of Symptoms of 33 Cases

Symptoms	*Number*	*Per cent*
Positive Weil-Felix	33	100
Positive Comp. Fix. Typhus	33	100
Headache	25	76
Backache	16	48
Arthralgia	16	48
Diarrhea	9	27
Chills	8	24
Nausea Abd. pain	8	24
Rash	7	21

All of the cases had a Weil-Felix (OX_{19}) agglutination, ranging from 1:500 to 1:5,000, in most of whom a rising agglutination titer was observed. Specimens of serum examined for complement fixing antibodies were positive at least late in all cases. In some instances a negative fixation was obtained early in the disease which became positive subsequently. In the sera of most patients, complement fixing antibodies were present which reacted with an endemic rickettsial antigen but not with an epidemic rickettsial antigen. In a few cases, convalescent sera had relatively large amounts of complement fixing antibody against an endemic antigen and small amounts against an epidemic antigen.[7]

The 35 remaining cases were seen by local physicians. The diagnoses in these cases were made by the history of the case, a positive Wei-Felix agglutination, and in all instances a positive complement-fixation reaction for endemic typhus.

Attempt was made to isolate virus from a few cases but these were unsuccessful. In addition, ectoparasites of rats trapped in homes in which certain of these cases occurred, were injected into guinea pigs, but no agent was isolated. Two of these guinea pigs, receiving respectively, 13 fleas (*Xenopsylla cheopis*), and a pool of 7 fleas, 2 sucking lice (*Polyplax spinulosus*) and 5 tropical rat mites (*Lyponysus bacoti*), showed sporadic, low fevers, and later resisted controlled challenge doses of endemic typhus

virus (Wilmington strain). This suggests that the ectoparasites in these tests probably carried the agent.

The evidence presented here indicates that endemic typhus fever exists in Kingston, Jamaica. The fact that 68 probable cases were found in a period of 5 months suggests that the disease is more common in Jamaica than was formerly believed. The clinical and serological evidence indicates that the outbreak was endemic typhus even though the etiological agent was not isolated.

NOTE: The authors wish to thank Major Hallinan, Chief Medical Officer, Jamaica, and his staff for their coöperation, as well as Lt. K. Wertman for his assistance in performing the complement-fixation tests.

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Rapid Detection of the Production of Acetyl-Methyl-Carbinol*

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THE Voges-Proskauer test is one of the most important means of differentiating between strains of the genera *Escherichia* and *Aerobacter*.. Various workers have recommended incubation periods of anywhere from 5 days down to 6 hours at 30° C. or 37° C. It is not within the scope of this brief paper to go into a detailed discussion of the V.-P. test. If demonstration of the production or non-production of acetoin could be encompassed within an ordinary laboratory working day (8 hours) such a procedure would be advantageous to laboratory workers.

There are several recent modifications of the V.-P. test. Werkman (1930)[4] suggested 4 days' incubation at 30° C. and the use of $FeCl_3$ as a catalyst. To 5 ml. of culture he added 2 drops of 2 per cent solution of ferric chloride then 5 ml. of a 10 per cent NaOH solution. (The ferric chloride should be added before the alkali to prevent marked flocculation.) A positive test is indicated by a deep copper coloration beginning at the surface and after a few minutes extending throughout the medium.

O'Meara (1931) suggested the following medium to be used for the Voges-Proskauer test:

Sodium chloride	5.0 gm.
Magnesium sulphate	0.2 gm.
$(NH_4)\ H_2PO_4$	1.0 gm.
K_2HPO_4	1.0 gm.
Sodium citrate	2.77 gm.
Glucose	5.0 gm.
Sodium fumarate	10.0 gm.
Distilled water to	1,000.0 ml.

He suggested the addition of about 0.25 gm. of creatine to 5 ml. of culture (grown at 37° C. for 24 hours) followed by 5 ml. of 40 per cent KOH. With O'Meara's technic[3] the red coloration of a positive V.-P. test appears in several minutes and increases with agitation of the tube contents.

Levine, Epstein, and Vaughn (1934)[2] combined the reagents (40 per cent KOH and creatine) suggested by O'Meara into a single solution consisting of 40 per cent KOH plus 0.3 per cent creatine. Their technic was as follows:

> A small loopful (1½ mm. diameter) of a young agar slant culture was introduced into about 3 ml. of Difco M.R.- V.-P. medium, the mixture incubated at 30° C. for 6 to 7 hours, after which the creatine-alkali test reagent was added.

Readings were taken after 1, 2, and 4 hours. The authors tabulated their results as follows:

TABLE IV*

Voges-Proskauer Reaction on 202 Aerobacter Strains Employing 6 and 7 Hour Cultures at 30° C.

Time Elapsed After Addition of Test Reagent	Time Elapsed After Inoculation	Positive Reaction: Number	Positive Reaction: Per cent
1 Hour	7– 8 Hours	157	77.8
2 Hours	8– 9 Hours	195	96.5
4 Hours	10–11 Hours	202	100.0

* From Levine, *et al.* (1934)

* The work herein described was made possible through funds of the Engineering Experiment Station, Iowa State College, Ames, Iowa.

It is evident from the table presented that with the technic of Levine, Epstein, and Vaughn, the time required for the completion of the V.-P. test may be reduced to a maximum of 11 hours.

Barritt (1936)[1] made no attempt to reduce the time required for the V.-P. test but tried by the use of alpha naphthol to make the test more sensitive. Barritt's technic is stated by himself as follows. "I have therefore employed cultures in 6 x 5/8 in. tubes of glucose phosphate broth (Ministry of Health, 1934) made with Difco bacto-peptone, which appears to be suitable for this test. After 3 days' incubation at 37° C. 1 cc. of culture was placed in a 6 x 3/4 in. test tube, to which were added 0.6 cc. of a-naphthol (5 per cent alcoholic solution), and 0.2 cc. of KOH (40 per cent solution). Equally good results were obtainable with 0.5 cc. of a 6 per cent solution of a-naphthol and 0.5 cc. of a 16 per cent solution of KOH." Using the foregoing technic Barritt obtained positive reactions in 2–5 minutes after the addition of the reagent.

The study herein presented was undertaken with two objectives in mind, namely: (1) to ascertain if production of acetoin (V.-P. test) could be detected within 8 hours, (2) the effect of temperature (30° C. and 37° C.) of incubation on the proportion of positive V.-P. tests.

In the experiments to be described, 216 known strains of V.-P. positive organisms were used. The following technic was employed.

A massive inoculum consisting of a loopful (2–3 mm.) of a 12 hour nutrient agar slant culture was introduced into 2 ml. of Difco M. R.–V.-P. medium (contained in 18 mm. tubes). The tubes were incubated at 30° C. for 6 hours and then 0.6 ml. of a-naphthol (5 gm. of a-naphthol in 100 ml. of 95 per cent ethyl alcohol) added, followed by 0.2 ml. of 40 per cent KOH to which had been added 0.3 per cent creatine. The tubes were then shaken vigorously for 30 seconds to 1 minute.

The foregoing experiment was repeated using 37° C. as the incubation temperature.

The results of both of the above experiments are presented in Table 1. A positive reaction was characterized by an intense pink to rose coloration developing in a few seconds to 5 to 10 minutes after the reagents were added. In both experiments 10 strains of *Escherichia coli* were used and were found to be negative.

TABLE 1

Voges-Proskauer Reaction of 216 Strains of the Genus Aerobacter Employing 6 Hour Cultures at 30° C. and 37° C.

Minutes After Addition of Reagent	Incubation Temperature			
	30° C.		37° C.	
	No. Pos.	% Pos.	No. Pos.	% Pos.
10	215	99.5		
30	215	99.5	190	87.7
60	215	99.5	198	91.7
120	215	99.5	200	92.6
400	215	99.5	200	92.6

From Table 1 it will be noted that at 30° C. 215 of the 216 *Aerobacter* strains gave a positive reaction within 10 minutes after the addition of the reagents. Thus, at 30° C., the total time consumed in the test, from the time of inoculation to the appearance of a positive test, was less than 6 hours and 15 minutes. In marked contrast, it is noted that at 37° C., 30 minutes after the addition of reagents, only 190 (87.7 per cent) of the cultures were positive and, even after 400 minutes, only 200 (92.6 per cent) positive reactions were obtained.

From the data herein presented, it may be concluded:

1. With the technic herein described, detection of a positive V.-P. test may be consummated in less than 7 hours.

2. An incubation temperature of 30° C. is preferable to 37° C. for the detection of the

maximum number of positive Voges-Proskauer tests.

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The Danger of Botulism

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ALTHOUGH the high fatality rate of botulism makes it a spectacular disease, botulism has never been regarded as a major health problem. A recent tabulation [1] shows, however, that during the period 1899 to 1941, as many as 359 outbreaks with 1,024 cases and 669 deaths were recorded in the United States and Canada. Many of these outbreaks occurred in the western states, particularly in the Rocky Mountain Region where the present writer and his associates reviewed and reported as many as 32 human outbreaks with 107 cases and 83 deaths, as well as several outbreaks involving burros, poultry, and mink.[2-5]

Most of these outbreaks were caused by eating improperly home-canned vegetables, and in view of the current shortage of food in this country and the consequent plans of many housewives to can as much food as possible this year, a timely warning may help to prevent a recurrence of the catastrophic outbreaks of botulism which followed the widespread use of the "cold-pack" method of home-canning during the first World War.[6, 7]

The first principle in the control of botulism is governmental regulation and inspection of commercial processing of all preserved food.[8] As a result of several devastating outbreaks of botulism caused by eating commercially canned ripe olives, this principle reached its highest development in California [9] but has been so widely adopted that very few outbreaks of botulism have been ascribed to commercially canned foods in recent years. We are therefore mainly concerned with the problem of home-canning.

This is primarily a problem in public education of housewives and others engaged in canning and serving foods. To undertake such education is a worth while effort in every community; it should be done under the auspices of every health department as a means of conserving food which would otherwise be wasted, at the same time avoiding the danger of food poisoning.

There are many women in this country who are well grounded in the fundamental principles of bacteriology as applied to home-canning, who intelligently and successfully, year after year, use controlled steam-pressure or intermittent methods of sterilization in canning, who are ever conscious of the danger of botulism in spoiled canned foods, who never taste or serve spoiled food, and who always re-cook canned foods before serving them. Deaths from botulism seldom occur among these housewives and their families. Such women in every community would make excellent instructors for groups interested in the art of home-canning.

There is also, unfortunately, a very large group of women who have little or no knowledge of bacteriology, who use antiquated "cold-pack" or other inadequate rule-of-thumb methods of canning, and who, having much spoilage, are vaguely conscious of an ill-defined element of danger which they attempt to avoid by tasting each jar of food before serving it. No doubt thousands of jars of harmlessly spoiled home-canned foods are discarded as a

result of this common practice, but, from time to time, a jar is encountered which contains botulinus toxin, resulting in the death of the "human guinea-pig" and often domestic fowls and other animals as well, though in these instances the other members of the family may not suffer. This is an important and relatively easy group to reach.

Finally, there is a group of people who are at the bottom of the ladder, educationally, socially, and economically, who use the crudest methods of home-canning, who are apparently oblivious to the danger of eating spoiled food and will eat anything out of a jar or can that looks like food and doesn't taste too bad. In some instances canned foods fermented by *Bacillus botulinus* have been especially relished for their exotic flavor or they may have been highly seasoned to mask spoilage. When botulism occurs under these conditions it usually takes a dramatic toll. This group is naturally the hardest to reach because aggressive personal instruction is required, but the effort is likely to pay good dividends.

It is not the purpose of this article to go into detail on the subject matter of such instruction, or to discuss the relative merits of the various methods now being advocated in farmer's bulletins.[10]

It is recognized that while the pressure-cooker, properly operated, provides the easiest and best method of home-canning there is likely to be a shortage of such cookers. Correct operation should be emphasized; we have recorded three outbreaks of botulism caused by foods supposed to have been sterilized in pressure-cookers.

Emphasis should undoubtedly be placed upon the following items:

1. Processes:
   a. Careful selection of sound produce.
   b. Careful cleansing, and when indicated, blanching, of produce, as well as general cleanliness to minimize the bacterial load to be sterilized.
   c. Principles and correct application of intermittent sterilization, as a valuable and available substitute for cooking under steam-pressure.
   d. Use of other methods of preserving food, notably drying, salting, and pickling in which there is little or no danger from botulism.
2. Consumption of home-canned foods.
   a. Significance of turbidity, gas-production, softening and odor as criteria of spoilage.
   b. Danger of eating or even tasting freshly opened home-canned foods, especially if signs of spoilage are present.
   c. Fact that certain foods, notably beets, chili, sometimes beans, and possibly other foods, may show no easily recognizable signs of spoilage even though botulinus toxin is present.
   d. Destruction of botulinus toxin by always boiling home-canned foods for at least 5 minutes before serving.
   e. Harmlessness of the spores of *Bacillus botulinus*.
3. Safe methods of disposal of contaminated foods by boiling in strong lye-water to avoid:
   a. Killing poultry and other domestic animals.
   b. Excessive pollution of the soil with the spores of *Bacillus botulinus*.
   c. Loss of usable containers.
4. In case an outbreak occurs:
   a. Character of symptoms of botulism and other forms of food poisoning.
   b. Prompt reporting of suspicious symptoms to physicians.
   c. Diagnostic value of symptoms in fowls and other domestic animals in case humans have tasted same food.
   d. Inadequacy of botulinus antitoxin for treatment of advanced botulism.
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California Adopts Revised Regulations Regarding Infant Diarrhea

Wilton L. Halverson, M.D., Dr.P.H., California Director of Public Health, has announced that the California State Board of Health has recently revised its definitions as to what constitutes a reportable case of diarrhea of the newborn, defining the disease as diarrhea in infants up to 3 weeks of age occurring in a hospital giving maternity service. Diarrhea shall be considered to exist when an infant has four or more loose stools in 24 hours, except in the case of entirely breast fed infants who show no other signs of illness and who are gaining weight. Strict regulations are prescribed for the isolation of infected infants and their contacts.

J. C. Geiger, M.D., Director of the Department of Public Health, City and County of San Francisco, reports an elevated rate of infant mortality for the first 4 months of 1943 and directs attention to the new requirements relating to deaths from diarrhea in infants. The infant mortality rate for this period in 1943 is 45.8, whereas for the corresponding period in 1942 it was 38.0.

Gearing Dental Public Health to Meet Wartime Conditions

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THE new socio-economic conditions created by the war have changed the dental public health picture to such an extent that traditional approaches to the problem are no longer satisfactory. A rapid summary of the situation shows:

There is a job for everyone who will work.

Relief rolls are reduced to only those who are unemployable.

So-called medical indigents are fewer than ever before.

Retired individuals, and women who formerly did not seek or need employment, are now working in offices, factories, and hospitals as a patriotic duty and not particularly for personal gain.

Workers in factories which have no dental provision in their respective industrial hygiene programs frequently find that appointments with the family dentist, if they can get to him, are very hard to obtain, if at all.

Reports from several factories have indicated that more time is lost on account of the lack of dental care than for any other reason. In certain areas workers sit in dental offices hoping that some person having an appointment will not keep it.

The armed forces, when commissioning dentists in the Reserve Corps during peacetime, were not concerned with the location of the men who were placed on their rolls. This is as it should be. Subsequent to the declaration of war, demands for dentists caused men to volunteer, and leave vital and poorly supplied areas. The draft and the activities of recruiting boards took others. While these events served military purposes, the distribution of dentists remaining in the population was not taken into account. Naturally there has been a decrease in dental services in many communities and a depletion in others.

The need of the armed forces for professional personnel has also created another unique situation. People and communities having financial resources have been reduced to the status of medical and dental indigents because they are unable to obtain services. In addition, new industrial areas have created community and health needs in places where no facilities previously existed.

We are told that very soon more than 50 per cent of production will be for war purposes. Increased production has increased the purchasing power of many people. Even though taxation will reduce the cash incomes to some extent, it is expected that a restriction of purchasable commodities will leave a large proportion of the incomes to be spent for personal services. This fact, coupled with the increase in employment, is creating a demand for long neglected dental services. This means that the established practitioners have less, rather than more time to devote to problems arising on account of the shortage of dentists.

A lowered standard of nutrition is a future possibility. The rationing of

sugar is looked upon by most of the dental profession as highly desirable, since the relationship of carbohydrate consumption to dental caries has been shown to exist. On the other hand, the absence of certain food constituents may cause a higher incidence of some diseases. Reports from England already indicate that there is a rise in the incidence of Vincent's infection. The newer forms of treatment used in Britain to control Vincent's infection include the use of certain food constituents.

Conventional dental practice has been established on the basis that if a given community could support a dentist, one would move into the area. It then followed that the needs of all the people within twenty or thirty miles would thus be met. Gasoline and tire rationing, coupled with higher incomes, now creates a problem never before visualized. Restricted civilian travel indicates that serious problems of distribution of services are ahead, not only in the newly constructed housing developments surrounding more populated areas, but in more rural areas as well. Programs utilizing centralized dental clinics are finding that the once helpful lay organizations no longer have the gasoline or tires to expend in transporting school children to the clinics.

Due to the lack of equipment and dental supplies, it is becoming increasingly difficult to purchase the necessary equipment for new offices or clinics. Existing clinics must, therefore, be operated more efficiently than ever, and the equipment of dentists who have gone into the armed services must be redistributed.

It must be admitted that even in peacetime the public as a whole has not received adequate dental care; in fact, only a small proportion has been economically able to obtain even the approach to ideal services. In wartime the construction of highly refined and time consuming precision appliances in dentistry should give way to basic routine treatment which will render the maximum amount of health services to the largest number of people. One may assume that much could be accomplished in this direction through voluntary effort.

The dental caries problem is different from other health problems. Nearly the whole population suffers from this disease. Dental studies show that after 6 years of age permanent teeth are attacked at the rate of ¾ of a tooth per child per year. The annual incidence of new defects, added to those already accumulated, presents a health problem of the first magnitude. At the moment there are no proven measures to prevent the inception of dental caries. The only effective method we have of preventing the sequelae of dental caries (infections and loss of teeth) is by utilizing remedial measures. In other words, without considering other oral diseases, to control dental caries dental service is continuously needed by practically everyone.

The problem resolves itself then, to the basic question—How can civilian dental needs (general health conservation and care of specific dental diseases) be met under the conditions created by the war?

To deal effectively with the points raised, it is necessary that:

1. Dentists remaining in civil life be distributed in the population according to the most favorable ratio permissible.

2. Industrial and vital war areas be supplied with dental facilities in order that no person shall be absent from his job because of the lack of basic dental services. This applies to both the factories and the nearby housing developments.

3. The usual school dental service programs be extended to include services to high school pupils. The gap in services between elementary school children and those in high school should be closed as rapidly as possible. The man power to supply dental service to these categories may have to be assigned by

procurement agencies, if objectives cannot be attained by voluntary efforts.

4. Sub-professional personnel be utilized to the fullest possible extent.

5. In critical areas it may be wise to request that highly refined mechanical dental appliances and replacements be not constructed until some more opportune time, and thus permit a health service type of dentistry to be rendered to a large number of patients.

6. In extreme circumstances, a system of priority of patients, which will give first consideration to the most productive members of the community, may be advisable.

State and local dental committees studying the problems of adequate dental care, in an attempt to foster the war effort by maintaining civilian health, would be extremely wise if they included on their committees representative individuals to act for the consumer groups—the general public.

Milk Laboratories in War Areas*

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LABORATORY methods for controlling the sanitary quality of market milk have been used in this country for about fifty years. Nearly forty years ago the first committee was appointed by the American Public Health Association to standardize such methods. Since then eight editions of *Standard Methods of Milk Analysis* have been published, and supposedly everyone in this country engaged in official analysis follows Standard Methods.

For years we have known that different laboratories fail to obtain the same result upon bacteriological analysis of the same milk supply, and much has been published on the inherent errors and inaccuracies of the methods. These differences assumed greater importance when recognition of the value of milk in nutrition resulted in its greater use by our increasing armed forces as well as by civilians, with consequent analysis of fluid milk by various official agencies.

In the interest of increasing the accuracy and dependability of bacteriological milk analysis, survey forms were prepared based upon Standard Methods (7th edition). These forms included one for the agar plate method, and one for the direct microscopic and methylene blue reduction methods.

Using these forms, surveys were made in defense areas, commencing in September, 1941. Laboratories doing official analyses were visited and observations made of equipment, general preparation and sterilization of material, and the actual technic of making the analyses, reading the results and recording or reporting these. With the view of securing closer compliance with Standard Methods, correct procedures were demonstrated and suggested and a blank copy of the survey form was left as a guide. A checked copy of the form with written recommendations regarding the deviations in equipment and technic was submitted later to each laboratory concerned.

The survey forms were revised in January, 1942, based upon the experience with the first hundred laboratories surveyed in 20 states east of the Mississippi River. In order to avoid misunderstanding, a number of items were amplified, frequently after obtaining, directly from members of the Standard Methods Committee, an interpretation of exactly what was intended. A few inconsistencies and errors in Standard Methods were corrected, and a few items not specified in Standard Methods were included. The additional material not in Standard Methods, but found necessary by experience, was taken up previously with the referee of that section of Standard Methods and included other ways of obtaining the same result (such as maximum-minimum thermometer instead of thermometer in container of liquid) or actual listing of something assumed in Standard Methods (such as using a separate pipette

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 30, 1942.

for each sample, and for each dilution).

An additional form was also prepared on which certain miscellaneous information not required by Standard Methods could be recorded, such as space and facilities of the laboratory. This form also listed the requirements of Standard Methods on Sampling, and certain requirements of health department practice pertaining to milk analysis where communities operated under the *Milk Ordinance and Code* recommended by the U. S. Public Health Service.

While earlier surveys had included only the larger defense areas, after war was declared an attempt was made to include all laboratories in each state doing official analyses, inasmuch as most places large enough to maintain a laboratory either were or would be war areas.

Of 281 laboratories making official bacteriological milk analyses in the 40 states (including the District of Columbia) surveyed to date, 276 used the agar plate method. Of these, 27 also used the direct microscopic examination, and 28 used the methylene blue reduction method for samples of producers' milk. In addition to these 276 labora-

TABLE 1

Summary of Items Pertaining to Apparatus Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

Item	Total Laboratories 276	DEV*	UND*	NOT*
4. *Pipettes*—A.P.H.A. specifications or accurately calibrated	134	3	...	
tips unbroken	14	3	...	
stored and handled in suitable containers (paper allowed)	5	3	...	
5. *Dilution bottles*—preferably resistant glass	...	1	...	
graduation marked indelibly	123	9	5	
solid stoppers or leak-proof closures	49	7	...	
6. Petri dishes—100 mm. x 15 mm.	14	...	...	
flat bottoms	...	2	...	
free from defects	4	4	...	
stored and handled in suitable containers (paper allowed)	3	37	...	
7. *Thermometers*—accuracy checked with thermometer conforming to specifications of National Bureau of Standards	188	41	...	
8. *Incubator*—water jacket filled or low temperature units or suitable area in constant temperature room within tolerance	53	17	...	
shelves suitably spaced	...	4	...	
temperature variations checked (with incubator filled)	121	40	...	
not less than 20" x 20" x 24" high (or equivalent space)	70	4	...	
kept in room of suitable temperature	0	...	...	
where room temperature is too high provide cooling	...	...	276	
9a. *Media-making equipment*—glass or other suitable utensils (which will not contaminate with toxic materials such as copper, zinc, antimony, chromium, etc.	4	22	...	
9b. *Hydrogen-ion*—accurate and reliable colorimetric standards or dependable electrometric equipment	62	30	...	
9c. *Melted agar*—(desirable) constant temperature water-bath or incubator at 45°–50° C.	153	58	...	
9d. *Counter*—uniform and properly controlled illumination (equivalent to Quebec counter)	116	12	...	
magnification	23	7	...	
ruled guide plate (rulings in squares preferred)	14	5	...	
9e. *Tally*—mechanical hand tally	116	2	...	
10. *Hot air oven*—suitable size	3	17	6	
proper construction	1	8	6	
suitable vents	4	6	6	
temperature variations within oven checked	214	24	6	
equipped accurate thermometer	53	24	6	
11. *Autoclave* (or pressure cookers)—suitable size	5	15	...	
proper construction	...	3	...	
equipped accurate thermometer	141	4	...	
accurate pressure gauge	5	5	...	
safety adjusted	0	...	...	

* DEV = Deviation; UND = Undetermined; NOT = Not Used

tories, 4 laboratories surveyed used the direct microscopic method and one additional laboratory used methylene blue reduction as the sole procedure in the control of retail pasteurized and raw milk. Since the agar plate method was so universally used, it was believed that a summary of the procedures used by those laboratories would be of most interest. Accordingly, compilations were made of the number of laboratories conforming to, and deviating from, each item of equipment, preparation, technic, and reporting required by Standard Methods.

In the interest of clarity, the figures presented in the following tables list only *deviations*, items *undetermined* because of local conditions at the time of the survey, or items *not used* in the particular laboratory. Thus, at a glance one may single out common deviations, and some of these will be discussed briefly. The entire survey form for the agar plate method has been divided into portions, and the material arranged so the results could be tabulated. The last 161 of the 276 laboratories reported upon were recorded on the revised forms and, in preparing the tables, the results of the first 115 laboratories recorded on the earlier form were also tabulated upon the present forms. This resulted in some instances in unduly large figures for items marked *undetermined*, where such an item was not included on the original forms. Likewise, the earlier surveys were based on the 7th edition of Standard Methods while the revised forms, based on the 8th edition, included four additional items. Consequently, these were marked "not used" when transferring the earlier surveys to the revised forms.

The requirements of Standard Methods pertaining to *apparatus*, are listed in Table 1.

As shown in *Item 4*, half of the laboratories were using, in whole or in part, pipettes that did not meet the specifications required by Standard Methods. Their use naturally resulted in errors in measurement also, as will be seen later. Similarly, nearly half of the laboratories used dilution bottles without markings, consequently errors in volume (which were quite common, as will be seen later) would not be observed. It is interesting to note that nearly 20 per cent were not using solid stoppers or leak-proof closures, with consequent failure to agitate the dilutions as required by Standard Methods (also to be seen later).

Less than 20 per cent of the laboratories had checked the accuracy of the thermometers used in incubators, as shown in *Item 7*. Considering the incubators proper, 75 per cent had suitable incubators, although less than half had checked the temperature variations of the incubators in use. Approximately one-fourth of the incubators in use were smaller than the minimum required by Standard Methods. As far as could be ascertained, all incubators were kept in a room of suitable temperature, being one of the five items of the total 165 items of equipment and procedure recorded on this form for which deviations were not noted in any laboratory. The last requirement in item 8 appeared in the 8th edition only, accounting for the large numbers in the "*not used*" column.

As shown in *Item 9c*, the form included one item of equipment not now *required* by Standard Methods, namely a constant temperature water bath or incubator for holding melted agar. Since lack of this control was the most common reason for trouble with precipitates in using the standard milk agar, this item was included but marked (desirable).

It is important to note (Item 9d) that only half of these official laboratories had an approved colony counter. It may be said now that in spite of the usual deficiencies in other equipment

and common errors in technic, some of the greatest errors in results were due to failure of laboratories to observe the actual colonies present on their own plates, usually due to lack of, or an inadequate, counting device

The information on hot air ovens and steam pressure sterilizers is presented in *Item 10.* To many the least important requirement in Standard Methods is that concerning checking temperature variations within the hot air oven. Usually laboratories tend to use higher temperatures or longer periods of sterilization than the minimum, or exceed in both respects. Occasionally, however, a laboratory will operate the oven at the minimum time and temperature listed in Standard Methods, without realizing there may be a number of degrees variation within the oven. A few laboratories were visited in which they had discovered this by sad experience. It is to be noted that over one-fifth of the laboratories felt able to operate their sterilizing ovens without

TABLE 2

Summary of Items Pertaining to Preparation of Materials Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

Item	*Total Laboratories 276*	*DEV**	*UND**	*NOT**
12. *Sterilization*—Sampling and plating equipment: dry heat whenever possible	17	4	1
not less 160° C.	26	53	10
not less 1 hour	7	7	11
not crowded	...	1	16
if chance of careless operation, record temperature used	12	24	225
record time attained, discontinued	6	23	231
Media, dilutions: autoclave 121° C. (place reliance on mercury thermometer, not on pressure gauge)	112	89	...
not less than 20 minutes	15	7	...
not crowded	1	2	...
air removed	...	5	...
tight stoppers loosened	4	2	1
if chance of careless operation, record temperature used	12	23	225
record time attained, discontinued	7	23	229
13. *Cleansing*—Pipettes: cleaning solution used frequently	13	11	...
subsequent rinse	1	7	...
Glass and metal ware: rinsed thoroughly in clean water after washing	...	1	...
acid or alkali not found by suitable indicator	2	97	...
14. *Media*—correct formula (beef extract, tryptone, glucose, best quality agar), or dehydrated media	52	3	...
distilled water	19	2	...
skim milk	72	1	...
use glass or suitable utensils free from toxic metals	4	19	...
prevent specks of dried or undissolved agar	0	...	...
prevent undissolved milk powder or its precipitates	18	86	1
unless dehydrated or within range, adjust to pH 6.6–7.0	7	2	...
use suitable pH standards or equipment	10	44	56
lost weight restored with hot distilled water (unless dehydrated)	1	6	...
if necessary, suitable clarification not affecting nutritive properties	1	1	...
suitable containers	1	...	...
amount in containers limited so any part is within 2.5 cm. of surface	30	10	...
suitable storage of flasks or bottles	1	1	...
final pH determined immediately before batch is used	201	16	...
and pH recorded	253	10	...
15. *Dilutions*—suitability of waters determined by plating dilutions periodically for 30 minutes	242	6	...
not used if cause decreased count	...	247	...
retested occasionally for freedom from toxic substances	259	8	...
prevent precipitates from the water	1	...	...
volume necessary before sterilization predetermined	(57)	(10)	...
each bottle observed for volume deviation	(18)	(9)	...
discard if variation from 99 ml. exceeds ± 2 ml.	(122)	(14)	...
or proportional tolerance if smaller quantities	(30)	(7)	...
or used promptly if measured sterilized water is added aseptically to sterile bottles	135	38	...

* DEV = Deviation; UND = Undetermined; NOT = Not Used

TABLE 3

Summary of Items Pertaining to Technic in Making Dilutions Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

Item	*Total Laboratories 276*	*DEV**	*UND**	*NOT**
16. *Plate marking*—before making dilutions arrange in order	36	4	...	
identify with sample number	2	1	...	
mark with dilution	1	8	1	
17. *Sample agitation*—agitate vigorously	12	12	...	
mix thoroughly	11	13	...	
immediately before removing portion	42	10	...	
before opening container remove all material from closure which may contaminate sample	2	15	...	
Sample bottles and vials: shake 25 times	44	14	80	
up and down excursion	80	10	80	
about a foot	105	13	80	
within 7 seconds	12	16	80	
18. *Dilution agitation*—immediately before removing portion	35	8	...	
shake 25 times	81	4	...	
up and down excursion	159	2	...	
about a foot	227	9	...	
within 7 seconds	20	12	...	
19. *Sample measurement*—separate sterile pipette for each sample	..	2	...	
pipette not wiped or dragged across lip or neck	1	6	...	
measure accurately	128	40	...	
no extra drops falling in	24	41	...	
let column drain	3	1	...	
blow out last drop quickly	106	20	14	
pipette not rinsed in dilution	20	3	...	
Cream—preferably weigh 1.0 gm. aseptically	...	5	267	
into sterile butter-boat or into dilution bottle	...	4	267	
on accurate cream test torsion balance or equivalent sensitivity	...	4	267	
if use pipette, free from air bubbles	...	238	32	
and volume delivered predetermined	151	88	32	
20. *Dilution measurement*—separate sterile pipette for each successive dilution	7	2	...	
pipette not wiped or dragged across lip or neck	3	7	...	
measure accurately	89	89	...	
no extra drops falling in	12	39	...	
tip of pipette at 45° angle	1	2	...	
touching neck of dilution bottle or rod in stopper	174	41	...	
touching Petri dish	71	10	...	
let column drain	5	4	...	
touch once against dry glass	182	24	16	
Petri dish cover raised carefully just enough to insert pipette	5	1	...	
21. *Dilution selection*—2 dilutions plated per sample (single plate restricted to supplies uniformly yielding 30–300 colonies)	90	16	...	

* DEV = Deviation; UND = Undetermined; NOT = Not Used

thermometers. Only half of the steam pressure sterilizers in use were equipped with thermometers.

The requirements of Standard Methods pertaining to the general *preparation* and sterilization of materials, media and dilutions, are presented in Table 2. The sterilization procedures are summarized in *Item 12*. In general these were satisfactory, although lack of control by thermometer is shown, particularly in the steam sterilization.

The cleansing of glassware, shown in *Item 13*, was, as would be expected, apparently well done in almost every laboratory.

The standard tryptone glucose extract agar was in use by 80 per cent of the laboratories, over 90 per cent of which added skim milk, 85 per cent of the latter using this without trouble with precipitates (Item 14). However, only 20 per cent of the laboratories checked the final pH of the media, and only 5 per cent kept a record of this detail.

The deviations in dilutions are shown in *Item 15*. Only 10 per cent of the laboratories had ever tested the suita-

bility of the water used for dilution. Deviations in volume were quite common, less than 40 per cent being within the tolerance allowed. Variations of 10 ml. per 99 ml. blanks were not infrequent, and an extreme variation from approximately 60 ml. to 140 ml. was observed. Certain aspects of deviations were noted separately (segregated by parentheses in the tabular material) for the 135 laboratories deviating in one or more of those four requirements.

The requirements of Standard Methods pertaining to *technic* in making dilutions are summarized in Table 3.

The agitation of samples is summarized in *Item 17*. In general the retail samples were well mixed, and 80 per cent of the laboratories did this immediately before removal of the portion for analysis. Samples in smaller bottles and vials, however, were not agitated, as prescribed, by a considerable portion of the laboratories. Similarly, a majority of the laboratories failed to agitate dilutions (Item 18) as vigorously as prescribed in Standard Methods. A number of laboratories did not use small sample bottles or vials, or used other methods with milk in such containers, accounting for the larger numbers in the "*not used*" column.

In *Item 19* it may be seen that inaccurate volumetric measurements were made in over half of the laboratories, partly as a result of not having standard pipettes, and partly due to improper manipulation.

Similarly, errors were made in measurement of the dilution itself, as may be seen in *Item 20*. *Item 21* shows that over one-third of the laboratories

TABLE 4

Summary of Items Pertaining to Plating and Incubation Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

Item	*Total Laboratories 276*	*DEV**	*UND**	*NOT**
22. *Plating*—dilution control, each series of samples, each lot blanks		100	10	...
agar control at end		25	1	...
[desirable, melted agar kept only short time		3	3	...
45°–50° C.		113	87	...
thermometer in container of water as temperature control in water bath or incubator]		252	8	...
after depositing desired portions, introduce 10–12 ml. of agar per plate		17	8	...
liquefied, not lumpy		2	3	...
at 41°–44° C.		10	192	...
within 20 minutes after transfer from sample		30	24	...
Petri dish cover raised carefully just enough to pour agar		12	3	...
flame lip of media container before pouring		10	2	...
periodically thereafter		41	11	2
agar and sample thoroughly mixed		7	59	...
spread evenly		...	1	...
by rotation and tilting		99	27	1
without splashing		15	11	...
solidified quickly		...	1	...
on level surface		1	1	...
inverted (unless clay tops are used)		...	2	...
placed in incubator at once		...	3	...
record time of plating if interval between sampling and plating exceeds 4 hours		111	67	...
23. *Incubation*—plate piles at least 1 inch from each other		98	61	...
and from tops and walls		54	38	...
piles on successive shelves not staggered		7	2	...
incubated 48 hours		2	1	...
35°–37° C. or 32° C.		31	59	...
thermometer in securely stoppered container of liquid (or accurate maximum-minimum thermometer) as temperature control on top shelf and on bottom shelf (or in portion of incubator room used)		253	3	...
temperatures recorded daily when in use for milk plates		262	1	...
excess humidity avoided		2	2	...
excess ventilation avoided (weight loss within 15%)		...	1	...

* DEV = Deviation; UND = Undetermined; NOT = Not Used

surveyed did not make suitable dilutions to yield the required number of colonies per plate for proper accuracy.

The deviations in *plating* and *incubation* are shown in Table 4. Over one-third of the laboratories did not plate out controls regularly. The large number of laboratories having no constant temperature control over melted agar resulted in the large numbers in the "*undetermined*" column concerning the temperature of agar when poured. The actual technic of plating was fairly well done in general, as would be expected in laboratories accustomed to plating.

There was failure to control the temperature of incubation in accordance with Standard Methods, comparatively few laboratories doing this correctly, as shown in *Item 23*. Temperatures of 33°–42° C. were observed in incubators supposedly operating at 37° C. Only five laboratories were noted in which the optional 32° C. incubation was being used.

The deviations in *counting* are shown in Table 5.

In spite of all other errors in equipment, preparation of material, technic of plating and incubation, the greatest effects observed upon the accuracy of results occurred where the proper plates for counting were not selected, the requirements of Standard Methods not being followed, or where laboratory workers failed to observe a considerable percentage of colonies on their plates, largely due to inadequate counting equipment. That this was quite common is shown in *Item 24*.

The two items marked with an asterisk and shown with large numbers in the "*not used*" column in *Item 24*, are

TABLE 5

Summary of Items Pertaining to Counting and Reporting Counts Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

Item	*Total Laboratories 276*	*DEV**	*UND**	*NOT**
24. *Counting plates*—count within 48 hours ± 3 hours, or place in refrigerator under 50°-F. for not over 16 hours (not routine)	6	5	...
average all plates with 30–300 colonies and no others (except average all plates of same dilution	171	36	...
If higher plate count is more than twice the lower, record the lower *	38	35	164
count all visible colonies on entire plate including pin points	72	33	...
count spreaders as single colony	2	2	...
if indication that spreader has repressed other colonies do not count plates	0	...	...
if spreader covers more than half the plate do not count *	...	...	161
not more than 5 per cent of plates ¼ covered with spreaders	13	3	...
use approved counting aid	111	11	...
any doubtful particles examined carefully	36	42	...
use hand tally	141	6	...
duplicate own counts within 5 per cent	20	128	...
duplicate other's counts within 10 per cent	52	93	...
if no plates 30–300, use that nearest 300	6	34	...
Estimations of plates exceeding 300: (a) if 5–10 colonies per sq. cm. count 12–14 sq. cm. areas, or if over 10 count 4 areas; factor for multiplication determined; *or* (b) use counting plate with radiating sectors and count colonies in opposite sectors	79	66	...
25. *Reporting counts*—report as "standard plate count" per ml.	57	34	...
record which temperature used	49	19	204
record kept of dilutions used	108	16	...
of colonies on each plate counted	134	14	...
multiply by proper factor	15	6	...
use only two significant figures	129	17	...
raise if figure dropped is 5 or more, lower if 4 or less	163	27	1
if plates developing less than 30 colonies must be used, report as "less than 3,000 per ml." if 1:100 dilution used, etc.	140	22	110
If all plates show no growth report as unsatisfactory *	...	1	160
26. *Control*—if bacteria failing to grow are suspected, check by direct method or additional plates at suitable temperatures	8	121	121

* DEV = Deviation; UND = Undetermined; NOT = Not Used

required only under the *Milk Ordinance and Code* recommended by the U. S. Public Health Service; hence their listing as "*not used*" in communities not operating under this ordinance. In many places suitable plates were not available at the time of the survey, again resulting in larger numbers in the "*undetermined*" column concerning duplication of counts within the tolerances listed by Standard Methods.

Finally, records were not kept as required by Standard Methods, as shown in *Item 25*. It might be mentioned that in several instances, laboratories failed to multiply correctly, and an original record of the dilution and colonies actually counted, would serve as a check on such errors. In at least 2 instances the mathematics of multiplying for a 1:100 dilution were too complicated. In one instance, in a small town for years, and in another in a metropolitan city for months, only one cipher had been used in multiplying for the 1:100 dilution.

The requirements concerning the recording of the incubation temperature used, and the reporting of plates with less than 30 colonies, were included only in the 8th edition, hence the larger numbers for these details in the "*not used*" column, together with one item (marked with an asterisk) required only under the *Milk Ordinance and Code* recommended by the U. S. Public Health Service.

While some of the requirements in Standard Methods may seem trivial, I believe I have seen practically every item violated sufficiently by some laboratory to influence the accuracy of the analysis.

The surveys show that each item required by Standard Methods has been adhered to by several laboratories, practically each item has been neglected by one or more laboratories. No one laboratory, at the time surveyed, had actually met all requirements in equipment and procedure, although a very few approached this. No laboratory conformed in all items of even the general group on apparatus, or technic. One laboratory conformed in preparation, one in incubation, 11 in counting, and 25 in reporting results, as shown in Table 6. This table also classifies the nature of the laboratories included in this report.

Almost universally it was the intention to follow Standard Methods, and the laboratories considered that the procedures they demonstrated conformed to Standard Methods. When the actual requirements were explained in respect to the deviations noted, and the proper equipment, technic, or procedure indicated or demonstrated, together with the reasons for such requirement; and when the probable inaccuracies of the local practice were pointed out, it was apparently the first time that a real understanding of certain requirements in

TABLE 6

Primary Nature of Laboratories		*Conformed with Standard Methods in*					
		Apparatus	*Preparation*	*Technic*	*Incubation*	*Counting*	*Reporting*
State—Health Department	31	..	..	..	1	2	4
State—Agriculture Department	6	..	..	..	..	..	2
State—Miscellaneous	6	..	..	..	..	1	..
State—Health Department *Branch*	24	..	1	..	..	1	4
County—Health Department	36	..	..	..	..	2	2
County—Health Department *Milk only*	10	..	..	..	..	2	5
City—Health Department	103	..	..	..	..	3	7
City—Health Department *Milk only*	28	..	..	..	..	..	1
Private—Clinical	16	..	..	..	..	..	..
Private—*Milk only*	8	..	..	..	..	..	..
Hospital—	8	..	..	..	..	..	..
	276	0	1	0	1	11	25

Standard Methods had been obtained. Sometimes it was true that Standard Methods had not been consulted, no copy being available, or that only an earlier edition was on hand. Several 1934 editions, a very few 1929 editions, and once or twice a 1923 edition, were unearthed. On the other hand, individuals have been known to refer to Standard Methods, and after reading the various possibilities discussed there, to do just opposite to the interpretation placed on the material by the Standard Methods Committee itself. Having witnessed the items incorrectly performed by the individual workers, the reasons for the requirements were discussed with them and a copy of the survey form summarizing the actual requirements of Standard Methods was left with them. This should result in immediate improvement in so far as technic is concerned, at least in the elimination of faulty practices not dependent upon equipment. The written recommendations made later on equipment focused attention on these deficiencies, putting this on record with the administrative officials, and indicating the basis for correction.

In size, the laboratories varied from that used once a month or so for milk analysis, to large general laboratories in metropolitan city health departments. In general, the larger laboratories were better equipped, but not necessarily so. Similarly, their technic might be expected to be above average, but in each of the largest laboratories visited, errors were made with a direct effect upon the accuracy of the results reported.

Few states have supervised to any extent laboratories within their area, and various systems have been used by the several states doing this, ranging from voluntary action to supervision in accordance with an act of legislature. Various factors influenced the type of supervision, this probably being best where the state laboratory administrator himself visited laboratories periodically. However, such persons are usually not specialists in milk analysis, and while in general the supervised laboratories were rather uniform in equipment and procedures, vital details have been overlooked in regard to technic, and in selection of, or in reporting, results. In many states there is no reliable source of advice or consultation, and it would seem desirable to foster such a service.

It is believed the U. S. Public Health Service survey forms should be of value to administrators in improving the work of laboratories in their jurisdiction. Likewise, they should be useful as a guide to the worker in service, and should be particularly helpful to those training new workers, inasmuch as this would give all workers something more tangible to follow than, for example, the 25–30 pages discussion in Standard Methods on the agar plate method. Use of such forms should also result in the methods now standard actually being followed by laboratories; something which we assumed was being done, but obviously has not been practised.

When one considers the help that bacteriological examinations have given in the sanitary control of milk, and considers the errors of omission and commission in following Standard Methods as listed here, the possibility is evident of their being even more useful and better correlated in the sanitary control of milk when they are properly performed.

Encephalitis (Western Equine) in Manitoba—1941*

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I KNOW it will seem to many of you like "bringing coals to Newcastle" to discuss in St. Louis the question of Encephalitis. However, following the epidemic of western equine encephalitis which occurred in 1941 in North Dakota, Minnesota, Saskatchewan, and Manitoba, we in Manitoba thought that we should carry on some experimental work in respect to the availability of a worth while immunizing agent; and, although the work in this connection is not as yet quite complete, we appreciate this opportunity of presenting certain material which we trust may be of interest and value.

Before discussing our immunization experiment we would like to give a short summary of the epidemiological features of the epidemic which occurred in Manitoba in 1941. A complete report of this epidemic will be found in the June, 1942, edition of the *Canadian Public Health Journal*. The epidemiological summary is taken from a paper in the report prepared by Drs. C. R. Donovan, and Maxwell Bowman, both of the Manitoba Department of Health and Public Welfare. The epidemic of western equine encephalitis in Manitoba was only part of a much wider epidemic affecting the States of Minnesota and North Dakota, and the Provinces of Saskatchewan and Manitoba.

After the disease became epidemic we requested our Division of Statistics to check back on the deaths during the epidemic and preëpidemic period and learn what the general death picture looked like in comparison to other years. This survey pointed out that there seemed to be a definite increase in deaths reported from certain types of conditions, such as cerebral thrombosis, hemoplegia, sunstroke, and in children, convulsions. In all instances deaths reported from these causes were referred back to the physician in attend-

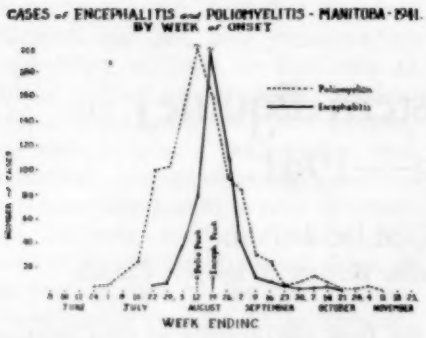
TABLE 1

Encephalitis Cases and Deaths in Epidemic Area—1941

Province or State	*Cases*	*Attack Rate per 100,000 Population*	*Deaths*	*Case Fatality Rate*
North Dakota	1,101	172	134	12.3
Minnesota	804	29	86	10.7
Saskatchewan	543	61	44	8.1
Manitoba	509	71	78	15.3
Total	2,957	58	342	11.6

* Presented at a Joint Session of the Health Officers, Laboratory, and Epidemiology Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

CHART 1



ance for a review; and, as a result of this, the cause of death in 5 cases was changed by the physician to "encephalitis." This probably accounts in some measure for the higher case fatality rate shown for the Province of Manitoba.

There was some delay in Manitoba in the appreciation of the fact that we had an epidemic of encephalitis in the making. We believe this was more or less to be expected because we were in the midst of an epidemic of poliomyelitis when the first cases of encephalitis started to appear, as Chart 1 shows; and, many early cases were diagnosed as poliomyelitis. In checking back over our records it would appear that the true epidemic started July 16 with a case in the City of Winnipeg; and sporadic cases appeared in widely separated points between that date and August 1. Each day thereafter showed a continued increase in cases and invasion of new areas until the whole of the settled parts of the Province, exclusive of the coniferous regions, were involved. The peak of the epidemic was reached during the week of August 19, one week after the peak of the epidemic of poliomyelitis—following which there was a rapid subsidence of reported cases until the epidemic could be considered to be over on or about the middle of September.

The significant points with regard to sex and age distribution of the reported cases are (1) a very high attack rate of infants under 1 year of age; and, I venture to say that a good many cases which occurred in this age group were not reported, probably because no physician was called, and therefore no diagnosis made; (2) a relatively low attack rate in the group which gives the highest attack rate for poliomyelitis; i.e., the age groups 1 to 20 years; and (3) a high attack rate in what might be classified as the "working-age" group; i.e., from 20 to 50 years.

Due to scarcity of labor a great many males in the older age group who had retired returned to work on the farms; and this is possibly one of the reasons why the age groups 50 years and over showed such a high attack rate. Chart 2 indicates that in every age group, excepting that under 1 year, the attack rate was considerably higher in males than in females—approximately two to one. Eighty-one per cent of the cases were in individuals of 20 years of age and over.

CHART 2

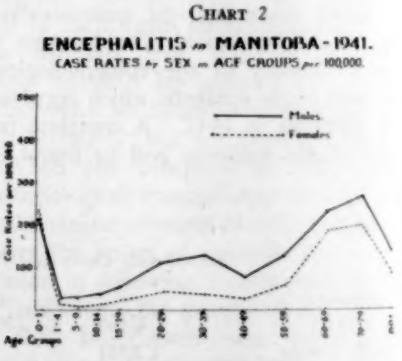


TABLE 2

Western Equine Encephalitis
Manitoba — 1941
Urban and Rural Distribution

Distribution	*Number of Cases*	*Per cent Total Cases*	*Attack Rate per 100,000 Population*
Urban	166	32.6	57.0
Rural	343	67.4	79.6

Table 2 shows the urban and rural distribution of cases, with percentages as well as the attack rate in each group.

Western equine encephalitis would definitely seem to be a disease of adult males in the older age groups, and adult males who work out of doors.

An attempt was made to try to estimate the prevalence of disabilities of various descriptions, both total and partial, which might result from an epidemic of western equine encephalitis.

A study of 256 cases was made in the spring and early summer of 1942, 10 months after the epidemic. Only 139 of these individuals, or 54.3 per cent, had completely recovered.

I would like to emphasize that our data are based on complaints of the patients themselves obtained through interviews by a public health nurse, or as happened in a few instances, by a letter addressed to the patient when an interview was not possible. As to the 45 per cent not yet fully recovered, I do not think we can blame the encephalitis entirely for their present condition. It must be remembered that a high percentage of them were in the older age groups and subject to the usual aging processes. However, it would appear that this disease may at least accelerate the normal aging process. Table 3 shows the disabilities complained of in order of frequency.

TABLE 3

Western Equine Encephalitis—Manitoba, 1941

Survey of 117 Cases Showing Disability Complained of Approximately Ten Months After Onset

	Cases	*Per cent*
Tired and weakness	70	27.3
Headache	46	18.0
Memory changes	27	10.5
Nervousness	26	10.2
Pain in extremities	23	9.0
Mental changes	17	6.6
Backache	17	6.6
Blurred vision	11	4.3
Insomnia	10	3.9
General malaise	8	3.1
Diplopia	8	3.1
Paresis	5	2.0
Dizziness	4	1.6

A case history which was brought to my attention just the day before I left Manitoba for this Conference is of interest from the standpoint of possible disabilities. Early in August, 1941, Mr. J., aged 92 years, was exposed to mosquitoes for a period of some two or three hours while sitting in his garden. This was the only occasion he had been out of a well screened house all summer. Two weeks later he developed a mild illness with some fever and mental disturbance. Recovery was complete with the exception of a certain amount of disorientation. A diagnosis of encephalitis was made due to the fact his wife had definite encephalitis a few days after his illness. Mr. J. died of pneumonia on May 30, 1942. A post-mortem examination was performed and the pathologist's report, in part, reads as follows: "Microscopic sections of the pons showed small areas of necrosis and gliosis with small areas of perivascular infiltration and cuffing. Diagnosis—Active Encephalitis." This diagnosis was made 10 months after the initial infection.

Dr. Harry Medovy, Pediatrician at the Winnipeg Children's Hospital, who made a special study of the infants under 1 year of age who had contracted the disease, indicates, in a paper which has been accepted for publication in the *Journal of Pediatrics*, that, of 17 cases studied, 5 show definite evidence of disability which probably will be permanent. Dr. Medovy also reports on 2 cases of intrauterine infection of the new-born. Both mother and baby in each instance showed the onset of illness approximately 5 days after confinement. Both babies are completely spastic and will be permanently incapacitated.

One cannot leave the question of disability without giving some consideration to how such an epidemic affects an all-out war effort. Manitoba is basically

a farming community and the effect of this epidemic on this basic industry was very considerable; especially as the epidemic made its appearance at the height of the harvest season. As near as we are able to ascertain at least 200,000 man-hours of labor were lost, just at the time when they were most urgently required to harvest the wheat and other grain crops.

In respect to the Army and Air Forces it is not possible to give the number of cases or the attack rate among those young men who had joined the colors. However, we may say that since the occurrence of the epidemic over one-third of the cases which occurred in the armed forces have since been discharged as "medically unfit" to take further training.

Taking into consideration the more or less disastrous results of this epidemic—and I might say here that the casualties from it were greater than the casualties the Manitoba troops suffered as a result of the Dieppe Raid—it was thought that something should be done in order to be prepared better in case of a future visitation, which we anticipated might take place in 1942. Fortunately, our fears were not realized, as few cases have been reported. However, when the problem was under consideration the most urgent need seemed to be to ascertain whether or not the vaccine given to laboratory personnel working with the virus, was as effectual an immunizing agent for man as the vaccine which has been widely used since 1937 for the protection of horses. We also wished to ascertain the dangers, if any, of its use; and what might be expected in the way of reactions. It was decided that we would try to immunize in Manitoba a large enough group in our population, particularly in rural areas, to give us a true cross-section of the male age groups which had been the most seriously affected in the 1941 epidemic. This immunization was on an entirely voluntary basis. Fourteen centers were selected, located principally in areas in which there were municipal doctors or salaried physicians.

The age group 21 years and over of the male population was chosen for the experiment, and in each of the 14 areas enough vaccine was distributed to immunize 50 per cent of this group. It was thought that the total group might be in the neighborhood of 3,000 persons, according to the areas and population selected. The greatest possible coöperation was received both from the public and the medical profession. If vaccine had been available and our plans had been more flexible, the total vaccinated could have been at least 5,000, as many more individuals signified their willingness to assist in this experiment than we were able to immunize. As a prerequisite of vaccination it was decided that we would obtain samples of blood from one in three of the persons being vaccinated. In all, some 1,000 pre-vaccination bloods were collected. As we had no laboratory facilities in our own province for the examination of these bloods they were examined for us by Dr. Charles A. Mitchell, Acting Dominion Animal Pathologist in the Federal Department of Agriculture, Hull, Quebec; through the kind coöperation of Dr. G. D. W. Cameron, Chief of the Laboratory of Hygiene in the Department of Pensions and National Health, Ottawa. It was found that 186 of the 926 specimens of blood examined, or 20 per cent, showed the presence of neutralizing antibodies in the individuals from whom the bloods were taken before immunization. Some 40 blood specimens of close contacts of cases were examined and the results were identical with those in this group. We believe that contact with a case, no matter how close, will not produce any immunity to the disease.

The vaccine used in the Manitoba immunization experiment was prepared

by the Lederle Laboratories and was a formalized chick embryo vaccine. Therefore, it would not appear that there should be any danger of inducing experimental infection. Our experience leads us to believe that no such danger exists, as in none of the persons immunized did any of the reactions suggest an infection of encephalitis. However, there were many mild reactions. We endeavored to obtain reports on all persons immunized and were successful in getting 1,754 reports. Table 4 gives the results of a study of the reports received.

TABLE 4

Western Equine Encephalitis
Reactions to the Administration of Chick Vaccine

Total number vaccinated (2 doses)	2,803
Total number questionnaires returned	1,754
No reactions to either dose of vaccine	768 (43.8%)
Reaction first dose—local, general, or combined	582 (33.2%)
Reaction second dose only—local, general, or combined	404 (23.0%)
Total reactions first and second dose, or both—local, general, or combined	986 (56.2%)

All evidence that we were able to obtain indicates that the reactions were not severe and did not require treatment by a physician. Certainly one is safe in saying that the reactions following the use of this particular preparation of chick embryo vaccine, although possibly more numerous, were not as severe as reactions following the use of either scarlet fever toxin or typhoid vaccine.

The full program for the sampling of bloods taken two to three months after the second dose of vaccine is not as yet complete, so that we are only able to report on a limited number of samples which were requested by Dr. John R. Paul of Yale University, and which were examined by Drs. Albert B. Sabin and Robert Ward of the Children's Hospital Research Foundation, at Cincinnati, Ohio. We are indebted to them for permission to give this information at this time (see Table 5).

These results are in agreement with those of Beard, et al.[1] at Duke University; and with the two more recent studies by Dr. Albert B. Sabin and his assistants at the Children's Hospital Research Foundation at Cincinnati; and by Drs. Webster and Casals of the Rockefeller Institute.

We are also informed by Dr. Charles A. Mitchell of Hull, Quebec, that in a series of 25 persons immunized in his laboratory with two doses of chick embryo vaccine, 100 per cent showed the presence of neutralizing antibodies following the completion of the immunization. It is hoped that when our vaccination experiment is completed we will add to the information already available as to the value of the vaccine for the production of neutralizing antibodies. We also hope to gain some experience as to what care is required in the matter of storing and shipping bloods when no immediate laboratory

TABLE 5

Effect of Western Equine Encephalomyelitis Chick Embryo Vaccine in Human Beings without Neutralizing Antibodies for the Virus before Vaccination

No. of Doses of Vaccine	*Time after First Dose (Weeks)*	*Individuals Total No.*	*Positive*		*Equivocal*		*Negative*	
			No.	*Per cent*	*No.*	*Per cent*	*No.*	*Per cent*
1 (1 ml.)	1	30	5	17	5	17	20	66
	2	13	6	46*	2	15	5	39
2 (1 ml. each dose 1 wk. apart)	2	17	17	100†	0		0	

* Average neutralization index = 800
† Average neutralization index = 6,000+

facilities for examination are available.

We intend to continue the immunization experiments in Manitoba with the expectation that ultimately clinical evidence will become available as to whether or not the vaccine is of sufficient value to justify its distribution on a free basis to physicians and medical officers of health.

SUMMARY

1. A short synopsis is given of the epidemiological features of an epidemic of western equine encephalitis in Manitoba in 1941, which indicates that this disease has the highest attack rates in infants under 1 year, and in adult males who live and work outdoors in rural areas. Evidence is presented which suggests that sequelae may be much more prevalent than is generally supposed and indicates that further follow-up of cases is required.

2. An experimental vaccination program on 3,000 persons is discussed. The information obtained from this work leads us to believe that

a. There does not seem to be any contraindication to the use of the vaccine, and that, although reactions may be numerous, they are not severe.

b. Two doses of the vaccine results in developing neutralizing antibodies in probably 100 per cent of persons vaccinated.

c. As yet there is not sufficient evidence available, especially of a clinical nature, to draw any conclusions as to the efficacy of the vaccine in protecting vaccinated individuals against the disease.

d. The results so far justify the continuation of experimental work in order that the clinical value of the vaccine may be ascertained.

NOTE: We would like to express our deep appreciation once again for the assistance of Dr. John R. Paul of Yale University; Drs. Albert B. Sabin and Robert Ward of Cincinnati, Ohio; and Drs. G. D. W. Cameron and Charles A. Mitchell, of the Federal Government of Canada. Without their help this report would have been impossible. We also desire to express our appreciation of the assistance received from Dr. W. G. Malcolm and Dr. Carey of the Lederle Laboratories at Pearl River, N. Y.

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Comparison of the Nasopharyngeal Swab and the Cough Plate in the Diagnosis of Whooping Cough and Hemophilus pertussis Carriers*

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THE nasopharyngeal swab, which has been used in the past in the diagnosis of pneumonia and in the detection of meningococcus carriers, was adapted by Bradford, Slavin, and Brooks [1, 2] to the diagnosis of whooping cough. The value of this method has been confirmed by Anderson [3] and in a preliminary study by the present authors.[4] Recently Brooks, Bradford, and Berry [5] have reported their findings in a total of 438 nasopharyngeal cultures from 248 cases of pertussis. A somewhat smaller number of cough plate cultures were taken for comparison. Fifty-two per cent of the nasopharyngeal cultures were positive as compared to 37 per cent of the cough plate cultures. In infants under 3 years of age the difference in the results with the two procedures was most marked —32 per cent.

The following report amplifies our previous one and contains some data on the carriage of *Hemophilus pertussis* by familial contacts.

The nasopharyngeal applicator and the technic of insertion have been fully described.[1, 4] The Bordet-Gengou medium we employed was the same as previously reported [4] and differed from that of the Rochester workers in that 33 per cent horse blood was added instead of 15 per cent sheep blood. Fresh media were prepared every 2 weeks. It did not appear necessary to pour plates any more often. For both the cough plate and swab cultures, Petri dishes 3½ inches in diameter were used. At least two Petri dishes of medium were inoculated with each swab, and the cough plates were also usually taken in duplicate.

The cultures were obtained by many different physicians and nurses. In more experienced hands better results might be expected.

One or more duplicate tests with nasopharyngeal swabs and cough plates were made in 214 cases of whooping cough. A total of 342 comparative cultures were examined. The results are classified according to the duration of the disease in Table 1.

During the first week 74 cultures were taken. In 32 both plate and swab were positive, in 6 the plate only was positive, in 22 the swab only was positive, and in 14 both cultures were negative. Eighty-one per cent were thus positive by both or either means. It is therefore apparent that the cultural methods available for the diagnosis of pertussis in the catarrhal stage are relatively

TABLE 1

A Comparison of Results with Cough Plates and Nasopharyngeal Swabs in 342 Tests on 214 Cases in Which Both Cough Plate and Swab Were Used Classified According to Week of Disease

Week of Disease	Both Plate + Swab +	Plate + Swab −	Swab + Plate −	Both Plate − Swab −	Total	Per cent + by Swab	Per cent + by Plate	Per cent + by Both (or Either)
1st	32	6	22	14	74	73	51	81
2nd	30	10	22	24	86	60	47	72
3rd	14	8	14	36	72	39	31	50
4th	12	3	8	28	51	39	29	45
5th	1	1	7	19	28	29	7	32
6th	1	..	2	11	14	..	..	..
7th	..	1	..	11	12	..	..	..
8th	..	..	1	3	4	..	..	..
9th	..	..	..	1	1	..	..	..
Total	90	29	76	147	342	49	35	57

\+ Positive
— Negative

efficient. This is fortunate as of course the diagnosis can rarely be made clinically until the second or third week of coughing. As Table 1 shows, the cultural tests become less reliable as the cough persists. In every week, however, the percentage of positives obtained by swabs was higher than that obtained by cough plates. This superiority was more noticeable in the first week and after the fourth week.

The results obtained in comparative tests are classified according to the age of the patients in Table 2. As has been stressed [5] the nasopharyngeal swab was particularly useful in obtaining cultures from infants. Sixty-three per cent of tests on infants under 2 years of age were positive by swab as compared to 40 per cent positive by cough plate. Rather curiously in the group over 10 years of age the difference in the efficacy of the two procedures was also almost 20 per cent.

When the total number of cases observed is tabulated, rather than the total number of tests, the results of the procedures appear in better light. In Table 3 are listed the results obtained in 225 cases. Sixty-three per cent were positive by swab at some time in their course (though some were not tested until the second month of the disease). Forty-nine per cent were positive by cough plate. Both of these percentages are of course higher than those shown in Table 1—49 per cent and 35 per cent respectively. The necessity of

TABLE 2

A Comparison of Results with Cough Plates and Nasopharyngeal Swabs in 282 Duplicate Tests Taken during the First Four Weeks of Cough Classified According to Age of Patient*

Age Years	Both Plate + Swab +	Plate + Swab −	Swab + Plate −	Both Plate − Swab −	Total Number Tests	Per cent + by Swab	Per cent + by Plate	Per cent + by Both (or Either)
Birth to 2	28	5	24	25	82	63	40	70
2 to 4	22	8	12	27	69	49	43	61
4 to 6	17	7	9	22	55	47	44	60
6 to 10	19	4	14	18	55	60	42	67
Over 10	3	3	7	8	21	48	29	62

* The figure 282 is one less than the total (283) for the first four weeks shown in Table 1, because the age of the child furnishing one duplicate culture was unknown.

TABLE 3

Results of Bacteriological Examinations in 225 Cases of Pertussis

(Many of whom were tested repeatedly though not all or always by both procedures)

Tested by Swab			Tested by Cough Plate		
Number of Cases	*Number Positive*	*Per cent Positive*	*Number of Cases*	*Number Positive*	*Per cent Positive*
220	139	63	219	107	49

214 cases tested by both procedures
6 cases tested by swab only
5 cases tested by plate only

repeating negative tests is therefore apparent.

It should be mentioned that the diagnosis of "pertussis" in the cases which yielded negative cultures was made on clinical grounds—typical paroxysms with or without hyperlymphocytosis. There is no doubt that atypical cases were missed by the bacteriologic tests as well as typical ones. About one-fourth of the bacteriologically proven attacks were not typical clinically. The epidemiological importance of atypical attacks of whooping cough was recognized more than 35 years ago by Luttinger.[6] Kristensen[7] has described the attacks in 116 children with positive cough plates as being atypical in 40 (35 per cent).

The possibility that some of the bacteriologically negative cases we observed might have been para-pertussis should be mentioned. However, this is not very likely as we are familiar with the cultural characteristics of *Bacillus para-pertussis*.[8, 9] It grows faster and more luxuriantly on Bordet-Gengou medium than does *H. pertussis* and hence is less likely to be missed if it is considered.

During the course of this study, a period of 2½ years, 5 strains of *B. para-pertussis* were isolated. (The cases are not included in Tables 1–3.) Three of these strains were recovered within a period of 1 month from widely separated parts of San Francisco. Only 2 of the 5 strains came from children with typical clinical whooping cough. In 3 instances the coughing was less severe, of short duration, and not clinically diagnosed whooping cough. Both nasopharyngeal swabs and cough plates were positive in 2 cases, swabs only were positive in 2 cases, and only the plate positive in 1 case. No positive cultures were obtained after the 14th day of the attack (3 children had stopped coughing by then).

It is our impression that whereas *B. para-pertussis* infections are probably quite common in this community—40 per cent of 50 children with negative histories were found to carry specific agglutinins,[10] this organism probably causes only a small minority of the cases of typical whooping cough. That still other organisms may be occasionally responsible for this syndrome is likely. Brown described a typical case associated with *Bacillus bronchisepticus*,[11] apparently communicated from a rabbit with snuffles. Alexander[12] has noted that occasional cases of chronic bronchitis, difficult to distinguish from whooping cough, may be due to infections with *Hemophilus influenzae*. Furthermore, we have occasionally found almost pure cultures of this organism on nasopharyngeal swabs or cough plates. It is not possible to say whether these were cultures of the etiologic agent or of a secondary invader. We did not type the cultures. However, Sinclair[13] and Alexander[14] have conclusively shown that *H. influenzae* type B is a dangerous respiratory pathogen in infancy. In any evaluation

of the diagnostic procedures under discussion or of the prophylactic effectiveness of *H. pertussis* vaccine, the possibility that apparent failures are due to infections with other organisms than *H. pertussis* must always be borne in mind.

Fifteen familial contacts, without cough or hoarseness, were cultured during the course of this study. The results of these tests are shown in Table 4. Three were contacts to cases of para-pertussis and the remainder to cases of pertussis—all bacteriologically proven. Two were infant siblings of children with pertussis and were injected with immune pertussis sera with prophylactic intent. Neither infant developed a cough and 4 repeated swabs on each child yielded negative cultures. Of the remaining 10 uninjected familial contacts to pertussis, *H. pertussis* was isolated by induced cough or by swab from 3. One of these 3 carriers was incubating the disease as he began to cough 3 days later. Kristensen [7] has described 9 similar incubatory carriers, and Blatt and his coworkers [15] first described asymptomatic contact carriers.

This evidence complements the epidemiologic evidence that healthy carriers exist. Their importance in the epidemiology of pertussis, however, is uncertain. Our carriers were certainly transient carriers and, without cough, they probably disseminated but few organisms. To the writers it would seem that mild and atypical cases, particularly in adults, together with early undiagnosed cases, probably are more important.

TABLE 4

Asymptomatic Familial Contacts to Cases of Pertussis and Para-pertussis

				First Cultures		Repeated Cultures				
Name	*Age*	*Culture in Case*	*Relation to Case*	*Swab*	*Cough Plate* *	*Swab*	*Cough Plate* *	*Swab*	*Swab*	*Notes*
E.S.	4 w	H. pert.	Sibling	—	..	—	..	—	—	Received immune
K.D.	9 w	"	"	—	..	—	..	—	—	serum prophylaxis
R.L.	4 y	"	"	—	+	..	..	..	..	Dev. pertussis 3 days later
R.S.	14 y	"	"	—	+	—	—	..	..	Never coughed
B.	adult	"	mother	—	..	..	..	..	..	" "
W.	"	"	"	—	..	..	..	..	..	" "
Sa	"	"	"	—	..	..	..	..	..	" "
Mc	"	"	"	—	..	—	..	..	..	" "
K	"	"	"	+	..	—	+	—	..	" "
C	"	"	"	—	..	..	..	..	..	" "
H	"	"	"	—	..	..	..	..	..	" "
Hol	"	"	"	—	—	..	..	..	..	" "
D R	10 y	B. para.	sibling	—	..	..	..	..	..	" "
R	adult	"	mother	..	—	..	..	..	..	" "
L.S.	"	"	"	..	—	..	..	..	..	" "

* Coughs were induced by placing swab in nasopharynx
H. pert. = *H. pertussis*
B. para. = *B. para-pertussis*

Isolation of the typical cases, undiagnosed until paroxysms have appeared, is certainly of limited value. The more widespread use of bacteriologic procedures to identify early cases, atypical cases, and carriers is therefore advocated. Nasopharyngeal swab cultures, more practicable and more productive than cough plates, should be given a trial in public health laboratories.

SUMMARY

Three hundred and forty-two com-

parative tests with nasopharyngeal swab cultures and cough plates were made in 214 cases of whooping cough. In every week of the disease, and in each age group the swabs yielded a higher percentage of cultures positive for *H. pertussis* than did the cough plates. The use of both procedures however was superior to that of the swab alone. Five cases of para-pertussis were encountered during the course of the study. Three carriers of *H. pertussis* were found among 12 familial contacts to pertussis.

The nasopharyngeal swab technic can provide the publbic health officer with a relatively simple means of detecting early cases, atypical cases, and carriers of *H. pertussis*.

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TUBERCULOSIS, INDUSTRY, AND YOUNG WOMEN

RECENTLY in an inaugural address as President of the National Tuberculosis Association, Dr. Lewis J. Moorman, of Oklahoma City, called attention to the tuberculosis hazards in the present situation where thousands of young women are going into industrial work. Dr. Moorman's address was scholarly rather than dramatic, and consequently did not catch the attention of the newspapers. He is, however, a sane and competent authority in the tuberculosis field and his anxiety as to what may happen is one which all public health workers should share, and share sufficiently to institute every possible measure for prevention and control in the situation which exists.

If one studies a graph which sets forth age-specific death rates for tuberculosis, it is noted that following a low mortality point in the age group 5–14 years, there is a steady rise in the death rate with each succeeding decade, so that in ages 65–74 years in 1940 in the United States the death rate from tuberculosis was 81 per 100,000 population as against 38 in the 15–24 age group, and 56 in ages 25–34. Assuming equal completeness and accuracy of reporting in the age groups concerned, one is justified in saying that in any given 10 year period, an individual 65 years of age is much more likely to die of tuberculosis than would be the case with one in his early 20's. This knowledge is exceedingly important from an epidemiological standpoint. It has made public health workers realize that elderly persons not infrequently serve as foci of tuberculous infection, and it has given a new insight into the natural history of the disease. At the same time, however, a consciousness that the highest tuberculosis death rate is in the elderly has tended to blur the fact that, because there are so many more younger people than there are older ones, a low tuberculosis death rate in young adults will produce a much greater number of deaths than a high tuberculosis rate in persons 65–74 years of age. Thus, although in 1940 the death rate from tuberculosis in persons 65–74 years of age was more than twice that in persons 15–24 years of age, the number of deaths from tuberculosis reported for that year was nearly twice as great in the young as in the old. An even greater number of deaths from tuberculosis in 1940 was in the 25–34 age group. So strong is the force of mortality from tuberculosis among comparatively young

persons that although, in the mass, tuberculosis ranks about seventh in a list of mortality from all causes, it is the leading cause of death in persons from 15 to 34 years of age.

It should be borne in mind, too, that the mortality curve in females reaches its high point (except for very elderly females) much earlier than is the case with males. The curve for the latter rises fairly evenly with age; the curve for the former climbs rather abruptly and tends to remain somewhat horizontal. Out of the fields of general physiology and pathology there have come bits of knowledge which throw some light on this sex differential, and it is a matter which deserves continuing scientific study. But one need not wait upon an explanation to appreciate the fact that young women offer a higher tuberculosis risk than young men; nor need one wait upon additional knowledge when it is already evident that the industrial worker in general has a higher tuberculosis mortality rate than has the white collar group. Today and now, the facts to face are that war's necessities are pushing one high rate group into the working and living conditions of another high rate group; and unless every possible precaution is taken, the complex and diverse factors which contribute to the high rates in these respective groups may act and react upon each other to the jeopardy of the human beings concerned. Obviously, the situation has within it all the elements of an epidemic (or high endemic) potential.

Although the tuberculosis hazard in industry, to the young and especially to young women, is recognized by the U. S. Public Health Service, by the National Tuberculosis Association, by various state and local health departments, and by many others concerned, it is not at all appreciated by young women. Actually, girls going into industry tend to believe that they acquire ruggedness by virtue of donning pants and getting their faces dirty. This attitude calls for sound and far-reaching instruction as to diet, rest, the danger of time-and-a-half and double time. It calls, too, for properly managed plant cafeterias and proper plant ventilation, for good public health nursing in the industrial community, for sound medical advice. In fact, it demands all those measures included in a good industrial hygiene program, including careful preplacement examinations and periodic x-ray surveys.

Tuberculosis has been present for so long and people are so accustomed to it, that the interest of the public and of many public health workers is in danger of being sidetracked to more glamorous and exciting problems. This is a serious deterrent to accomplishment in this field. Further, the decline in tuberculosis, both in morbidity and mortality, in the last 40 years, may lead some to think that the problem is one of the past. Let there be no mistake in this direction. Tuberculosis continues to be a real problem. If, instead of comparing the tuberculosis rate of today with what it was 50 years ago, one will compare the tuberculosis prevalence and mortality of today with today's prevalence and mortality of other diseases, the present seriousness of the tuberculosis problem can be appreciated: In the most productive period of life, tuberculosis continues to cause more deaths than any other one disease.

TERMINOLOGY IN HUMAN MALARIA

IT is generally accepted that human beings are subject to infection by three, perhaps four, species of malarial organisms. These are *Plasmodium vivax*, *P. malariae*, and *P. falciparum*, with *P. ovale* somewhat recently described as

a separate species. Further, the diagnosis and epidemiology of these different types of infection have been fairly well worked out and current research gives promise of sound advances in treatment and control. However, in the matter of terminology there still exists rather a distressing lack of uniformity, disturbing to those particularly interested in malaria and probably confusing to medical students and casual readers of texts, monographs, and papers on this subject.

This lack of uniformity in terminology of malaria probably arises because the disease is an old one and the development of knowledge has been piecemeal. One of the earliest clinical designations was in relation to the continuity or lack of continuity of fever, and to express these differences one finds, particularly in the older literature, reference to *intermittent* and *remittent* malaria. Similarly, clinicians have used terms to indicate the severity of a given case of malaria, as *benign, malignant,* and *pernicious malaria.* Attempts have been made too to suggest certain aspects of a given illness in terms of some outstanding symptom, as *cerebral malaria, hemorrhagic* malaria. This sort of terminology has always been frowned upon by those interested in precise nomenclature, and has nothing to commend it.

Perhaps the terminology in most common usage relates to the periodicity of paroxysms, as *tertian, quartan,* and *quotidian* malaria. This method of designating the various forms of malaria is as old as Hippocrates and has the advantage of wide acceptance. It is not, however, satisfactory for, while malaria caused by *P. malariae* usually manifests quartan periodicity, frequency of paroxysms may not in all instances be correlated with a particular type of malarial organism. To complicate the matter further, the term *subtertian malaria* has been developed. This connotes a type of malaria with a tendency toward every-other-day paroxysms but with some divergence from that periodicity. As ordinarily employed, it indicates a falciparum infection. This is a particularly unfortunate term, especially where, in a given paper, one finds *malignant tertian* and *subtertian* used synonymously in the same paragraph. Some of the outstanding authorities on malaria are guilty of such usage and juxtaposition. Disturbing, too, is the fact that many who ought to know better speak of *tertian, subtertian,* and *quartan organisms.* This, of course, is inexcusable.

Another term not infrequently found in clinical texts and in the older writings is *estivoautumnal malaria,* or *estivoautumnal organism.* This again refers to the falciparum type. It bears no relation to etiologic, pathologic, or even symptomatologic terminology, but arises mainly because in many areas the environmental conditions necessary for the development of this type of infection tend to occur most often in the late summer and early autumn. Finally one encounters a terminology built upon an etiologic basis. Out of this come the designations *vivax malaria, falciparum malaria,* and *malariae malaria.* Dr. Mark Boyd, at the Philadelphia meeting of the American Association for the Advancement of Science (December 30, 1940–January 1, 1941), recommended that, for precision, human infections be designated by the name of the causative parasite, but suggested that for euphony the term *quartan malaria* be substituted for *malariae malaria.* Another authority which would substitute etiological designation for terminology now in current use, is the 1942 Edition of the *Standard Nomenclature of Diseases. The International List of Causes of Death,* however, adheres to clinical designations and would have all deaths from malaria reported as either benign tertian, quartan, tropical (malignant) tertian, or "other or unspecified malaria." Strange to say, the *International List,* in the index, does not even

carry the terms *falciparum, vivax,* or *malariae;* and stranger still, indicates *subtertian malaria* as properly reportable under *benign tertian.*

Inasmuch as malaria is one of the important, perhaps the most important of the tropical and subtropical diseases and, in view of the fact that we shall in the future be learning more of it, if not suffering more from it, it is highly desirable that there be adherence to uniform and consistent nomenclature. It would seem sensible that all individuals and agencies bend their efforts toward adoption of the etiological terminology. Unless one does this, precision is out of the question; and although it is recognized that *malariae malaria* is a clumsy term, we should not be inclined to sacrifice consistency to euphony. Fortunately, it is not a term that will have to be used very often, and, at that, it is not nearly so clumsy as *Rickettsia prowazeki prowazeki* or *Rattus rattus rattus,* both of which manage to find their way into print if not into decent conversation.

As an editorial policy, the JOURNAL will in the future attempt to be consistent in this matter and, so far as nomenclature is concerned, will bluepencil all terms not in conformity with a terminology based upon etiology.

THE Editor has just received from the Surgeon General of the U. S. Public Health Service a very welcome communication bearing upon the recently held United Nations' Conference on Food and Agriculture. This summary, the Surgeon General tells us, was prepared at his suggestion by Dr. William H. Sebrell. Believing that JOURNAL readers will be interested in this analysis and interpretation of the Food Conference by an outstanding authority in the field of nutrition, the communication is published below. The caption was chosen by Dr. Sebrell, and because of its significance, is included.

THE MARRIAGE OF PUBLIC HEALTH AND AGRICULTURE

A new and higher level of health for all mankind is the hope which springs from the United Nations Conference on Food and Agriculture held at Hot Springs, Va., May 18 to June 3, 1943. The Conference declared its conviction that this hope can be realized through improved nutrition, and recommended that every nation accept as a prime obligation the adaptation of its national and international policies to this end.

The growing recognition of the prime importance of nutrition in health has gone hand in hand with the development of the science of nutrition. Practically all of what may be called the modern knowledge of nutrition has developed during the present century and much of it since World War I. The discovery of the many vitamins, recognition of the great physiological importance of the various mineral salts, and the development and use of better methods for the diagnosis of deficiencies have made the entire world increasingly aware of the enormous amount of ill health, poor development, suffering, disease, and death due either directly or indirectly to malnutrition.

International attention was first focused on the problem by the activities of the League of Nations beginning in 1925, culminating in the reports of the "Technical Commission on Nutrition" and the "Mixed Commission" on nutrition in 1937. Ever since that date, nutritional knowledge has advanced so

rapidly that in 1942 our own Food and Nutrition Board of the National Research Council was able to draw up a new and more complete set of recommended dietary allowances for optimum nutrition. Several world prominent physicians and scientists in the field of nutrition participated in the Conference, and data presented brought out that, measured by the National Research Council yardstick, much of the world's population is subsisting on inadequate food, and that, in terms of adequate food for everyone, not only has no real food surplus ever existed but the world has never had enough to eat.

The Conference stressed the importance of full collaboration between agricultural and health authorities indicating that the latter must play a prominent part in the guidance of the program for better nutrition.

The revolutionary ideal which met with unanimous acceptance at the Conference was that it is one of the primary responsibilities of the state to see that its population has an opportunity to obtain a food supply adequate for health, and that agricultural policies both national and international must be directed toward this end. Recognizing that the immediate attainment of such a goal is out of the question for most nations, it was proposed that each of the 44 nations represented should immediately initiate nutrition programs designed to bring about progressive improvement in national diets, giving special attention to the nutrition of the most vulnerable groups in the population such as low income groups, infants and pregnant and nursing mothers. To attain these goals, national nutrition organizations were recommended for each country. In order to attack the problem effectively, it was pointed out that in addition to dietary survey data, health and medical surveys are necessary, using the newer clinical and laboratory methods both for assessing the state of nutrition and determining the prevalence of gross deficiency diseases.

In addition to such national activities, an international interim commission was recommended to be followed by a permanent organization for the purpose of collecting and disseminating research data and statistical information and for giving technical assistance where requested. Basic considerations necessary for the success of these plans but beyond the scope of the Conference are guarantees of peace and national security which have greatly influenced agricultural policy in the past.

It is obvious that if the world's agriculture can be based on freedom from want of food for all peoples in all lands, we can have an era not only of economic prosperity but also of health prosperity such as the world has never seen. The success of the deliberations of the United Nations Conference is a first step on this new pathway.

REPORTS OF COMMITTEES

The By-Laws of the American Public Health Association provide that no standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council. Except where specifically noted to the contrary, the following reports are in the nature of progress reports from committees, most of which have had Section approval, but which have not been presented for Governing Council action, and therefore are not to be interpreted as standards approved by the American Public Health Association.

Pneumoconiosis

Industrial Hygiene Section

ALTHOUGH the silicosis problem is not now attracting the attention it received a few years ago, its control and the control of dust in industry are still live subjects. According to a recent issue of the Ohio Industrial Commission *Monitor*,[1] occupational disease experience in Ohio continues to show a substantial increase in compensation claim cost, and revision upward in the occupational disease rates has been required in 76 industries. This upward revision is particularly pronounced in industries where dust diseases are prevalent.

In view of the possibility of increased incidence of dust diseases among coal miners as a result of accelerated production to supply expanding industrial requirements for coal, the recent publication by the British Government of the Medical Research Council's report [2] dealing with conditions in the South Wales coal fields is of considerable interest, as it calls attention to the pneumoconiosis hazard among soft-coal miners. There has been much controversy in England regarding the pulmonary condition found among the South Wales coal miners; some investigators claim that the condition is not silicosis. The definition of silicosis (based on the classification adopted at the International Conference on Silicosis in 1930) as applied to compensation schemes in Great Britain at present is "fibrosis of the lungs due to silica dust." This standard of diagnosis requires for compensation pulmonary disability and definite nodulation or consolidation as revealed by x-ray examination. According to the Council's report, strict adherence to this definition has prevented the compensation of bituminous-coal miners suffering from disabling pulmonary disease, apparently of occupational origin. The Committee on Industrial Pulmonary Disease that made the medical study in the South Wales coal fields stated that, although there are certain distinctions between the pulmonary abnormality found typically in colliers and that found typically in hard-heading workers, it is impracticable to differentiate between them in routine work. Much importance is given in the report to pulmonary changes that up to the present have not been considered a cause of disablement. On the basis of the x-ray

COMMITTEE ON PNEUMOCONIOSIS
Published reports: *Year Books* 1931–1932, 1932–1933, 1933–1934, 1935–1936, 1941–1942.

findings, the cases were grouped as (1) normal, (2) reticulation, and (3) consolidation, subdivided into nodulation and more advanced stages. According to the investigators, as regards associated frequency and degree of respiratory disability, "reticulation" occupies a position intermediate between normal and consolidation, not much below the nodulation subsection of the latter, but much below the more advanced stages of consolidation. The report stated that—

> Reticulation appears to indicate a condition of the lungs which may cause respiratory disability, but this occurs mainly in middle-aged and older men. As a corollary, a fairly considerable proportion of men showing reticulation will have no detectable disability —as will also some men with nodulation. In fact, only in the men with most advanced changes is there full agreement between the x-ray changes and the clinical evidence of disability.

The recommendations of the committee include the following:

> 1. New terminology. "Pneumokoniosis in coal workers"—this to include reticulation even in the absence of other x-ray changes, and to cover all coal workers, whether on the surface or underground.
>
> 2. Existing criteria of diagnosis to remain:
>
> (a) Positive x-ray findings of a definite character;
>
> (b) Presence of disability.
>
> 3. A warning against neglect of hard headings and mention of certain preventive measures. The main aim must be to reduce dust created at the coal face.
>
> 4. Initial and periodic examination considered desirable.

In summing up the report of the Silicosis Research Committee, Dr. T. W. David of the Amalgamated Anthracite Collieries stated:

> The industry is now faced with pneumokoniosis affecting large numbers of workmen, many of whom in the later decades of life may be materially disabled by cough and shortness of breath. It is proposed to make this condition compensatable. The effect of this will be, particularly when collieries shut down, that claims to compensation will be greatly increased and that many cases will be included for compensation when any disablement, possibly only doubtfully due to the lung condition, can be put forward. Regulation regarding environmental conditions, possibly methods of mining, and certainly dust suppression, will be put forward, adding materially to the present arduous task of the colliery manager.
>
> A system of initial and periodic medical examination will be an essential development and a high standard of physical fitness should be demanded. One highly desirable effect will be the exclusion of infective cases from the mines. Apart from its necessary impact on the question of labour supply, this measure will create a large social problem. Firstly, there will be the problem of treatment of disabled workmen, particularly in those cases where there is an element of infection. Secondly, there will be the vast problem of providing employment for suspended workers with little or no disability. At first the number of these is likely to be large, and provision for them will demand considerable effort and organisation.
>
> It can be seen, then, that the difficulties which will be raised by pneumokoniosis in coal workers are likely to be great and varied, and their solution will demand action on a scale which will be beyond the resources of the industry itself.

Studies made in an anthracite and two bituminous-coal mines in the same district in Russia [3] yielded results somewhat similar to those obtained in the South Wales coal fields and in the United States. According to the Russian studies, miners in the anthracite mines were affected by more serious forms of pneumoconiosis, that limited their working capacity, than were miners in bituminous-coal mines. The limitation of working capacity among anthracite miners was determined mainly by emphysema and myocardial damage. One of the main points of interest in the results of the Russian investigation was the contrast in incidence of pneumoconiosis between the anthracite and bituminous miners examined from the same region. After reviewing the many and very variable factors in the Don collieries that might affect the recorded amount of pneumoconiosis at

a particular mine—the method of mining, the geological and hygienic features and concentration of dusts in a mine, the length of employment of the men, and the departure from the mine of the unfit—the investigators concluded that the contrast in incidence is genuine, and that pneumoconiosis, as an occupational disease, is to be particularly considered in connection with anthracite mines; such mines therefore require radical measures for the reduction of dust. One of the causes of the difference in reaction of the two types of miners is thought to be the physical properties of anthracite dust, which has a more noxious effect on the lungs than the dust from bituminous coal; the work of several Russian authors is quoted in support of this suggestion.

In the anthracite colliery investigated, pneumoconiosis was found in 11.1 per cent of the men, while in the two bituminous collieries the incidence was 3.3 and 2.3 per cent, respectively. Comparing one mine with another by periods of service, there was little difference in the younger employment groups; in men of more than 20 years service, however, an excess was evident in frequency and in degree of pneumoconiosis in the anthracite mine over the two bituminous mines; the percentage affected in this employment group in the anthracite mine was 27.1 and in the two bituminous-coal mines 13.5 and 11.0 per cent, respectively.

Although comparison of data obtained under conditions that probably are not comparable is of questionable value, the apparently rather close agreement of the figures showing the occurrence of silicosis or anthracosilicosis in certain coal fields of Russia, England, and the United States is interesting. According to the studies in a Pennsylvania anthracite mine, 23 per cent of the miners examined were affected by anthracosilicosis.[4] In anthracite mines in the South Wales coal fields,[5] 18.7 per cent were affected, while the figure obtained in Russia was 11.1 per cent. Silicosis was not found in the South Wales coal fields among bituminous-coal miners who had worked fewer than 10 years in the mines. In those who had worked 10 to 20 years the incidence was 3.5 per cent, and in those who had worked more than 20 years it was 3.2 per cent. The incidence in the anthracite mines was 3.9 per cent for those employed fewer than 10 years, 18.6 per cent for those employed 10 to 20 years, and 29.0 per cent for those who had worked more than 20 years. The percentage for all the bituminous-coal miners examined in Utah was 3.2 per cent, while for underground workers it was 4.6 per cent. Anthracosilicosis was not found among Utah bituminous-coal miners who had worked fewer than 10 years; however, the incidence of the disease rose from 1.7 per cent for those employed 10 to 19 years and 5.1 per cent for those employed 20 to 29 years, to 22.5 per cent for those employed 30 or more years. The incidence of anthracosilicosis for the anthracite mines of Pennsylvania cannot be compared with that for the South Wales mines, as data for the former are grouped according to amount (dust concentration) as well as period of exposure.

Another interesting report of pneumoconiosis among coal miners, by Dr. R. Harold Jones of Fairmont, W. Va., was published recently in the *Journal of the American Medical Association.* Dr. Jones stated[6] that several years ago he and his colleagues were impressed with the number of soft-coal miners who presented themselves at the Laird Memorial Hospital with a major or a minor symptom of chronic cough or dyspnea, usually referred to by the patient as "miners' asthma." Dr. Jones and his colleagues became interested in these cases and obtained a careful history, especially with regard to indus-

trial aspects. During a 4 year period, 86 cases of silicosis were discovered in which silicotic changes were present in varying degrees. Only those cases with exposure to dust in bituminous-coal mines alone are discussed in Dr. Jones's report. He stated that in this study he had attempted to show that silicosis in soft-coal miners is not a rare disease, that "miners' asthma" and anthracosilicosis are one and the same, and that the entity can be detected by searching clinical study of persons employed as underground workers in the mining and preparation of bituminous coal. Although it has been demonstrated that the greater number of cases occur in the decades from 40 to 60 years of age, and that most of those disabled by anthracosilicosis are in this span, four men in the next younger decade (30 to 39 years) were disabled. All of those in the disabled group had spent a large part of their mining life as drillers, motor runners, coal shooters, or machine men. These occupations appear to be the most hazardous from the viewpoint of exposure to siliceous dust, to the extent of causing disability. He concluded that disability is not necessarily proportionate to the total number of years employed in the mining industry but depends more on the occupation. However, a lesser but definite degree of anthracosilicosis does occur, although not to a disabling extent, in loaders and other underground workers after long years of employment.

Post-mortem studies revealed two types of pneumoconiosis in soft-coal miners—the normal deeply pigmented lung, with definite changes of associated silicosis resulting from long years of exposure to bituminous-coal dust containing silica, and advanced conglomerate pulmonary silicosis with a minimum of anthracotic pigment.

The following statement by Dr. Jones would seem to indicate that considerable work remains to be done on the subject of pneumoconiosis and that a profitable field for investigation might be the bituminous-coal mines of the United States:

> Unfortunately, little work has been done on group surveys of underground workers in the bituminous-coal industry. Before a definite impression can be had as to the real incidence of silicosis and anthracosilicosis in these workers, systematic studies of large groups in the soft coal fields will have to be carried out. At the same time, information regarding dust hazards as determined by thorough engineering surveys is almost completely lacking. Before worth while statistics become available showing the actual incidence and degree of silicosis and the hazards due to bituminous-coal dust containing silica in the bituminous-coal industry, thorough industrial engineering and medical surveys in the various fields must be made and the results of the two correlated.

Mention might be made of the apparent tendency to lower somewhat the standards formerly set as a safe concentration for exposure to various types of dust. The tentative standard of 5 million particles per cubic foot of air for dust, irrespective of its silica content, seems to have been too high according to results of some more recent studies. In a discussion at the Fourth Saranac Laboratory Symposium on Silicosis, Dr. Gardner[7] stated that, although the maximum permissible dust concentration in iron mines is 5 m.p. per cu. ft. of air, as the rock contains as much as 50 per cent silica it has been assumed that it would be safer to impose the use of masks than to experiment upon the men with the possibility of producing silicosis after 20 or more years of employment.

From data on the relationship of silicosis to dust concentration obtained from a study of silicosis and lead poisoning among pottery workers, which showed clearly that even moderately severe cases of silicosis occur at relatively low concentrations of dust, the Division of Industrial Hygiene of the National Institute of Health[8] con-

cluded that if the dust exposure could be brought below 4 m.p. per cu. ft. new cases of silicosis would not develop.

Clifford S. Gibson,[9] Engineer and Secretary of the Technical Silicosis Research Committee of the Ontario Mining Association, stated recently that the general aim in Ontario is to reduce the dustiness of the air to the lowest possible limit. Although 300 particles per ml. has sometimes been considered a safe limit, the tendency recently has been to reduce this to 200 particles per ml., and it is significant that in an industry with air-borne dust containing up to 29 per cent of quartz, dust control measures installed have reduced dust counts to 50 to 100 particles per ml. around some operations. Such provisions would not have been made if they had not been thought necessary.

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Check Anthrax—A Warning and a Plea*

Industrial Hygiene Section

IN 1938 we brought the review of the literature on anthrax up to date. In 1939 we presented a "Twenty Year Survey of Anthrax in the United States," which embraced all the previous statistical reports we had made and covered the experience in this country for the period 1919–1938. We hope to make a 5 year report for comparison in 1944. It is being brought to our attention that there is an alarming increase in anthrax in this country, particularly in the wool industry, and last year we made a brief report on the experience of Philadelphia as indicative of that of the rest of the country, particularly in those places where wool industries are located. We brought to your attention at that time the concern of the States of New York, New Jersey, and Pennsylvania regarding this situation. This year we have received a query from the State of New Hampshire, which at the time of our last statistical report had had no cases for 10 years prior to that time, mentioning 7 cases in one mill in 3 months. Because of the increasing seriousness of this situation and the excellent coöperation of Dr. P. F. Lucchesi, Acting Chief of the Division of Communicable Diseases of the Philadelphia Department of Public Health and Superintendent of the Philadelphia Hospital for Contagious Diseases, in supplying complete and reliable statistics for the City of Philadelphia, we have felt it advisable again very briefly but emphatically to call your attention to the status of this problem in the city as an indication of the larger problem we are facing in the country as a whole.

Table 1 illustrates this trend.

TABLE 1

Anthrax Cases in Philadelphia by Sources of Infection

Period	Total Cases	Goat Skins	Goat Hair	Horse Hair	Wool	Wool and Hair	Fur Pelts	Other
10 yrs., 1929–1938	58	28 (48.3%)	7	..	15 (25.9%)	5	..	3
3⅝ yrs., 1939–Aug., 1942	59	12*(20.3%)	6	3	29 (49.1%)	7	1	1
1939	10	3	..	1	5	1	..	..
1940	12	..	4	..	6	1	..	1
1941—8 mos.	11	3	1	..	5	1	1	..
" 4 "	11	1	1	..	7	2	..	..
1942—8 mos.	15	5*	..	2	6	2	..	..

* 1 case traced to sheep skin

It is readily evident from this table that the incidence of anthrax has almost trebled since the beginning of the present war and that it is still increasing. It is also evident that while the number of tannery cases in relation to the total number of cases has *decreased* by more

* Report of the Committee on Industrial Anthrax.

COMMITTEE ON INDUSTRIAL ANTHRAX

Organized 1924. Published reports. *A.J.P.H.* Nov., 1924, Jan., 1926, Feb., 1930, *Year Books* 1934–1935, 1939–1940, 1941–1942. The two most informative reports, while not published, were mimeographed for distribution by the U. S. Public Health Service—reports of Oct., 1938, and Oct., 1939.

than 57 per cent, the number of cases due to wool has *increased* approximately 90 per cent. We have pointed out in many of our past reports that, until England opened her wool-disinfecting station in 1921, wool anthrax in this country was almost negligible (3.2 per cent of the total number of cases for the 5 year period 1919–1923 as compared with 27.2 per cent for the 5 year period 1929–1932), and that the increase was due to the deflection of inferior wools to this country where disinfection charges need not be paid.

The sources from which the infective materials were obtained have been recorded in every case in Philadelphia, at least since 1932. Unfortunately it is extremely difficult, especially in bales of wool or hair, to select specific samples for analysis which actually contain the organism, so that all materials used at the time of onset of the case must be regarded as suspicious. These materials came from widely distributed geographical areas, including South American, African, European and Asiatic countries, and were so hopelessly mixed that no particular source could be singled out as being the point of origin of any given case or group of cases. However, in replies from 49 countries in these continents to questionnaires sent out in 1939, we obtained information showing that both animal and human anthrax were decidedly widespread, and indicating that there might be good reason to suspect almost any of the materials listed. In many of our previous reports, we have pointed out the worthlessness of consular certification to the effect that areas from which such materials are shipped are free of anthrax. In peacetime the skin or wool from one animal in a whole bale might be infected while in wartime, as happened in the last war, materials which cannot readily be moved remain piled on docks, become soaked, and eventually permeated with anthrax from the one skin or fleece, thus increasing many fold the possibility of the final handler's becoming infected from the single originally infected animal. Undoubtedly the longer the war continues and the longer the elapsed time between the death of animals and the importation of their products to this country, the greater will become the increase in wool anthrax. This holds equally true of goat skins, but the reduction in tannery anthrax during this period might well be due to the reduced use of goat skins for fancy shoes, and the increased use of packer-killed-cattle hides for the more durable shoes. We may very well expect that, with the close of war and a return to greater use of imported goat skins in the tanneries—skins which have been long in reaching their ultimate destination—we shall again see an increase in tannery anthrax as well as in wool anthrax.

In our 1939 report we pointed out the definite trend toward increased agricultural anthrax in this country. This does not of course show in our Philadelphia figures and we have not collected figures since that time to show whether this trend is continuing, but you will remember that in each successive 5 year period a greater number of states reported anthrax cases, and that the percentages of agricultural cases to the total number of cases in the four 5 year periods showed a progressive increase—namely 13, 14, 26, and 34 per cent.

It is regrettable that with such a situation so few of our state departments of health take an active enough interest to collect complete information on all such cases or to act in preventing a further increase. It is still more regrettable that the U. S. Public Health Service has ceased to make anthrax in this country reportable to them. That

action in itself has given state authorities and others the impression that it is no longer of sufficient importance to be considered. While it is true that the total number of cases and deaths in any one year from this cause is small compared with that from some other conditions, it is also true that it can become a much greater menace if not checked. Although our present incidence in Philadelphia is less than 2 per 100,000 population, that for Chile, for instance, in 1938 was 12 per 100,000 population, with a fatality which had increased from 6 per cent in 1920–1924 to over 20 per cent in 1938. And we have sufficient evidence from early times that it is not impossible for this malady to assume the proportions of a plague. By way of comparison, taking figures at random from the *U. S. Public Health Reports* for September 4, 1942, the average 1937–1941 incidence for both diphtheria and typhoid-paratyphoid in the 89 registration cities was slightly over 9 per 100,000 population, and Pennsylvania states her poliomyelitis incidence in 1941 to be less than 8 per 100,000 population; yet authorities throughout the country are keenly awake to these hazards and are doing all in their power to keep them down.

We do not want to lose sight of the definite desirability of the establishment of government controlled disinfecting stations, for wool and hair at least, at ports of entry, such as England has so successfully operated. We realize, however, that with the present war emergency we have no hope of immediate action in this direction and that the best we can do for the present is to bring the situation emphatically enough before local health authorities and the industries themselves, so that they will be alert to their own problems and take whatever action they can to check or lessen the anthrax hazard in their own locality. In the case of wool and hair industries, it is not out of the question to adapt the English method of disinfection in combination with wool scouring, without much additional equipment. One mill in New Hampshire is already preparing to do this experimentally upon our advice. Of course it will add to the expense of wool processing and will not be so kindly received by manufacturers who are not made to realize the hazard involved. But, lacking any satisfactory method of disinfection nearer the source of supply, mills in which cases recur—and there have been 4 of these in Philadelphia alone in the last year—should afford to take this precaution. Wool, as processed at present, can remain infective throughout, as evidenced by cases in handlers of finished products only, so that disinfection as soon as it enters the plant, or before it enters the plant if scoured wool is obtained from elsewhere, should do much to lessen this hazard. Our present methods of so-called disinfection for wool do *not* disinfect, as we have pointed out before.

With the tannery problem it is more difficult to offer specific suggestions, but it is a problem which should be given serious consideration, with enough research being backed by private or government agencies to develop a satisfactory method for skin disinfection which could eventually be applied to government disinfecting stations at ports of entry or, better still, at ports of shipping. As we have said before, no method economically within reason which will adequately disinfect and at the same time completely satisfy the manufacturers' requirements for a tannable skin, has as yet been developed. The Schattenfroh method is fairly adequate and has been found satisfactory to some Europeans, but it is rather expensive, and some of our American tanners complain of its effect on the

skins. The Lehmann method is adequate and satisfactory only if the skins are tanned at once, since it softens them too much if they are left for some time before being tanned. Our experimental iodine disinfection, when tried out on a semi-plant scale, did not prove satisfactory without the addition of potassium iodide, or unless the iodine was in colloidal form, which makes this method entirely out of the question financially. And of course, as we have so often previously stated, the government recommended lime-soak and bichloride methods are entirely inadequate.

While the solutions of the problems of wool and tannery anthrax are primarily in the hands of state and federal health and labor agencies, that of agricultural anthrax is more in the hands of the U. S. Bureau of Animal Industry and state departments of agriculture, who, as often happens, are more awake to the problems of saving animals from this hazard than our health authorities are to that of saving human beings. The weapons of attack here are greater insistence upon prophylactic inoculations of herds and flocks in areas where the disease has been known to exist, and not only increased activities in insisting upon proper disposal of carcasses of animals dying of anthrax, but particularly education of farmers, sheep men, and cattle handlers, in recognizing such carcasses so that they will not autopsy them to determine the cause of death, as has so often happened.

Just a word concerning the treatment of cases once they have developed. Of the 26 cases treated in Philadelphia in the 12 month period, September, 1941, through August, 1942, 17 received serum alone or in combination with other treatment, and 19 received neoarsphenamine alone or in combination with other treatment. We mentioned last year that we had no record of any fatality in this country in an anthrax patient treated with neoarsphenamine. The first exception to this statement has occurred this year in Philadelphia with 2 fatalities, one of which, however, was a pulmonary case which had been treated for 2 weeks as a pneumonia patient before an anthrax diagnosis had been made and serum and neoarsphenamine administered. We are coming more and more to feel that neoarsphenamine is the treatment of choice, especially since it can always be readily available.

In closing, I wish to make a strong plea that we do whatever may be in our power to awaken authorities to our increasing anthrax hazard, and to stimulate them into sufficient interest and activity to check this hazard now, before it approaches the major hazard class.

HENRY FIELD SMYTH, M.D.,
Chairman
WALTER D. HIGGINS, M.D.

Ventilation and Atmospheric Pollution

Industrial Hygiene Section

Part I

Suggested Standards

THE committee's Suggested Standards were adopted as so-called "Working Standards" by the Section on Industrial Hygiene at the Milwaukee Meeting, 1935. They have been reprinted since that date in the Annual *Year Books* (with the exception of 1939–1940, when they were cited), and with only slight changes.

No changes have been made in the subjoined list of 15 items for Suggested Standards as published in the *Year Book* 1941–1942. However, considerable thought has been given to item 6 with the suggestion that it might read as follows, for which comments are invited:

"Surrounding surface temperatures (*e.g.*, floor, wall, ceiling) a few degrees higher than air temperature during the heating season, and, except floor temperature, a few degrees lower than air temperature during the cooling season, wherever this can be obtained economically."

A two-season system composed of *surface* positive radiations during the heating season, and cooling *ventilation* only (that is, without purposeful radiation) during the cooling season, is a second suggestion. Third, simply a warmed floor during the winter and cooled air during the summer might prove practical in many situations. Nothing should imply substitution of radiant methods for the present convection methods, except that a moderate amount of seasonal radiation is desirable wherever it can be obtained economically.

Outline of working standards for atmospheric and space environments for the maintenance of comfort, health, and efficiency, assuming altitudes not exceeding 10,000 ft. above sea level*:

1. Cool rather than hot †—but avoiding a sense of chilliness.
2. Dry rather than damp.†
3. Still ‡ or moving, depending upon physical activity.†
4. Some diversity in temperature—time and space—rather than uniformity and monotony.†
5. Foot level as warm as head level.
6. Radiant, *i.e.*, local heat source as an item in heating, preferred.

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* Agreements as to the majority of the exact specifications, of interest to engineers, and correlation with A.S.H.V.E. standards were summarized in the report of this Committee (*Year Book*, A.P.H.A., 1934–1935, pp. 108–112).

† Adapted from the British Health of Munition Workers' Committee, Memorandum No. 9, 1916.

‡ "Still" implies air motion under 25 ft. per minute.

COMMITTEE ON VENTILATION AND ATMOSPHERIC POLLUTION
Organized 1931. Published reports: *Year Books* 1932–1933, 1934–1935, 1935–1936, 1936–1937, 1937–1938, 1938–1939, 1939–1940, 1940–1941, 1941–1942.

7. Shockless temperature differentials between air conditioned quarters and outer air, depending upon the length of stay indoors, *i.e.*, less differential for brief stays.

8. Essentially noiseless conditioning apparatus.

9. Allotments for floor area, air space, and air supply should be sufficient to fulfil physical, physiologic, epidemiologic, and psychologic requirements of the occupants in any given enclosure.

10. Reduction of obnoxious dusts, bacteria, fumes, vapors, and gases to their sub-danger thresholds.

11. Satisfactory primary sense impression upon entering the room or space.

12. Maintenance of comfortable conditions during occupancy (room comfort impression).

13. Sufficient replacement of "foul air" with "fresh air" to meet odor-comfort requirements. Entrainment or filtering out of objectionable industrial odors.

14. Ultra-violet or actinic ray effects on air or occupied space to be deferred for later consideration.

15. Intelligent supervision.

The items of compressed and rarefied air are not considered here.

The Committee desires to call attention to *Report No. 76* of the Medical Research Council (Industrial Health Research Board), London, 1936, 109 pp., entitled, "The Warmth Factor in Comfort at Work. A Physiological Study of Heating and Ventilation, by T. Bedford. (Note especially "Equivalent Conditions of Warmth"—discussion of Scale with Chart—pp. 50–56 of this *Report*.)

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The following paper by Professor Yaglou was presented at the St. Louis Meeting at the special request of the committee.

Defense Ventilation and Air Conditioning Problems

VENTILATION and air conditioning are contributing an important part in production for national defense. The necessity for uninterrupted production under conditions of blackout has led to the design of windowless "blackout plants" for airplane factories, munition plants, and for other key defense industries.

These plants are huge single-story buildings with few or no interior partitions. Raw materials go in at one end and finished products come out at the other. Except in cold weather, much artificial cooling is required to remove excessive heat from furnaces, machinery, and solar radiation. Aside from human comfort requirements, temperature control is essential to insure precision of finished parts for airplanes, tanks, instruments, etc. Controlled humidity is often necessary to prevent rusting of highly finished parts; to maintain uniform regain in the manufacture of powder, and in the loading of fuses and shells; and to avoid generation of static sparks.

An undesirable feature in the design of some blackout plants is the lack of segregation of clean from the toxic process. Air pollution may be particularly aggravated in warm weather when the outside air supply is normally reduced to about one air change per hour in the interest of economy.

For small workshops and factories that are ventilated by natural methods, several types of blackout ventilators have been developed which obscure the outward passage of light without ob-

structing air flow too much. Some of these are equipped with a fan and are suitable for attachment to roofs or side walls.

Another interesting application of air conditioning is in blast furnaces of steel plants. It has long been known that removal of water vapor from the air supplied to blast furnaces increases their capacity, yields a more uniform product in silicon and sulfur content and reduces coke consumption. During periods of overproduction, manufacturers have shown little interest in this possibility, but with the present crisis in steel production there is considerable incentive.

The primary object of air conditioning is to dry the air blast and preheat it to about 1,300° F. The saving of fuel results from reducing heat wasted in dissociating water vapor. For every pound of water dissociated by intense heat, in the presence of reducing agents, 6,850 B.T.U. are absorbed and the waste is greatly reduced by drying the air.

Much more thought is now being given to the ventilation and air conditioning of ships than ever before. Air conditioning of gun turrets aboard fighting ships has speeded up the firing rate by removing powder fumes and keeping the temperature down. Submarines and sick bays of surface ships cruising in tropical waters are now cooled to overcome temperatures of 90 to 95° F. and humidities approaching the saturation point.

Despite official denials, rumors persist that some of the larger German tanks are cooled by refrigeration in the blistering heat of Libya. According to a French publication, refrigeration is accomplished by means of a methyl chloride absorption system utilizing exhaust gas heat for motive power.

Many other war uses could be added, such as the testing of aircraft engines, guns, and pilots in extreme cold, the drying of foods to save shipping and storage space, the processing and storage of blood plasma, sera and vaccines, manufacture of synthetic rubber, etc.

In the field of industrial toxicology, war production has introduced new occupational hazards, requiring changes of medical procedures and of engineering methods of control. Some of the new chemical and physical irritants used are more toxic than the ones they have replaced.

An important improvement in hood design is the substitution of low resistance exhaust systems for the conventional high resistance systems, resulting in a substantial saving of power and of critical materials.

Among the new developments in air conditioning is the conduits system of ventilation which distributes conditioned air at high velocities through small conduits instead of large ducts. The system requires no more floor area and wall space than the steam pipes of a heating system.

The Public Buildings Administration has developed an inexpensive warm air furnace for low-cost defense houses which have no basements. The furnace has a capacity of 60,000 B.T.U. per hour, and utilizes an electric blower for circulating 600 c.f.m. of air. It is being used by practically all governmental agencies constructing defense houses.

A compact and inexpensive centrifugal air washer is being developed for decontaminating air from chemical war gases and mists by centrifuging and countercurrent washing with chemical solutions. It is intended for use in air raid shelters, trucks, tanks, and dugouts, as well as in large public enclosures. Using suitable chemicals, it will dehumidify air to a low humidity at a fraction of the cost of present methods.

The War Production Board has re-

cently prohibited the manufacture, sale, and installation of new air conditioning equipment for all uses except where necessary to meet military and essential civilian needs. Another WPB ruling, applying particularly to defense housing, for which critical materials are to be allocated, limits the net hourly output capacity of the heating system to not more than 66 times the dwelling area in square feet or 80,000 B.T.U. per dwelling unit, whichever is the smaller. Government regulation of the maximum heat transfer coefficient of building materials is a step in the right direction even in peacetimes, and has long been in force in Germany and in the Netherlands. In Sweden the use of double windows is compulsory.

Fuel conservation has now become a wartime "must," at least on the Eastern Seaboard. Some medical men believe that compulsory reduction of house temperature to 65° F. may prove beneficial to health, but the majority of workers on the subject expect considerable discomfort and perhaps a few more "colds" until persons adapt themselves to this lower standard. There is no good evidence to show that a temperature of 65° in the house, office, or school menaces health, but there is much proof that it affects seriously the American standard of comfort.

Discomfort will be greatly alleviated by insulating buildings to keep exposed walls and windows warm, by wearing heavier underclothing, and by stopping drafts from fire places and doors. Fundamentally, the problem of fuel saving is not so much a matter of drastic reduction of indoor temperature as one of insulation and thrift in the use of fuel. In average New England winters, a reduction of indoor temperature from the customary 72° to 65° F. will reduce fuel consumption by not more than 20 per cent, or almost as much as can be saved by weather stripping of windows and exposed doors. Complete house insulation, including wall and roof insulation in addition to weather stripping, may save as much as 60 per cent of fuel, and, by shutting off unused rooms, still greater economy may be expected. FHA loans are available for house insulation and can be paid back out of fuel savings.

C. P. YAGLOU

Part II

Standard Methods for the Examination of Air

THIS committee, organized at the Pasadena Meeting in 1934, and representing the Industrial Hygiene, Engineering, and Laboratory Sections, has reported annually in the *Year Book*, chiefly through its four subcommittees, one of which, that on Chemical Methods, reports this year on the determination of cadmium in air.

As heretofore, comments and suggestions are invited and may be taken up with any member of the committee or subcommittees, as befits the subject matter.

EMERY R. HAYHURST, M.D., *Chairman*
HARRY B. MELLER (*Engineering Section*)
JOHN F. NORTON, PH.D. (*Laboratory Section*)
PHILIP DRINKER
LEONARD GREENBURG, M.D.
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CAREY P. MCCORD, M.D.

I. Report of
Subcommittee on Physical Procedures in Air Analysis

THIS committee directs attention to its report in the *Year Book 1938–1939*, entitled "Instruments and Methods for Recording Thermal Factors Affecting Human Comfort," in which very slight changes were recommended as published in the *Year Book 1939–1940* (page 91).

The committee is digesting the latest advances in the field which it plans to incorporate in a revised report next year.

C. P. YAGLOU, *Chairman*
ALONZO P. KRATZ
C.-E. A. WINSLOW, DR.P.H.

II. Report of
Subcommittee on Chemical Methods in Air Analysis
Cadmium and Hydrogen Sulfide

THIS year's report includes the determination of cadmium and hydrogen sulfide, two contaminants which are of immediate interest in the war effort.

DETERMINATION OF CADMIUM IN AIR

Occurrence and Method of Collection:

Cadmium as an air contaminant occurs usually as the oxide in the form of a dust or fume and may be collected in the impinger with water as the medium, or with the electrostatic precipitator.

Cadmium (Cd) has an atomic weight of 112.41, melting point 321° C., boiling point 767° C. Cadmium volatilizes when heated and burns, yielding a fume of brown cadmium oxide (CdO).

The American Standards Association has set the maximum allowable concentration of cadmium or of its compounds at one milligram of cadmium per 10 cubic meters of air (Nov. 2, 1941). The literature cited included the following methods.

Cadmium Sulfide Method

Procedure:

Transfer the sample to a 250 ml. Phillips beaker and add sufficient nitric acid for the destruction of any organic material which may be present. Add 10 ml. sulfuric acid (1:1) and heat until fumes of sulfur trioxide are freely given off. Dilute to 75 ml. and add 1 ml. of copper sulfate solution (200 mg. $CuSO_4.5H_2O$ in 100 ml. H_2O). Add 2 gm. of sodium citrate. Neutralize the solution with ammonia and adjust the acidity to pH = 3. Pass hydrogen sulfide into the resulting solution for about 10 minutes, add 1 drop of 5 per cent aluminum chloride solution and allow to stand 6 to 12 hours. Filter, dissolve the precipitate in nitric acid and hydrochloric acid and carefully evaporate to dryness. Take up the residue in water, and make up to a convenient volume in a volumetric flask. An aliquot portion of this solution is used in a Nessler tube for the final reading.

Add 5 drops of 10 per cent potassium cyanide to the aliquot in the Nessler tube, 5 ml. of hydrogen sulfide water, and make up to the mark with distilled water. Mix thoroughly and compare under flood of ultro-violet light with

standards similarly prepared. The solution should exhibit a bright clear yellow color under the mercury arc.

A standard cadmium stock solution may be prepared from cadmium metal by dissolving 1 gm. of cadmium in nitric acid and making the solution up to 1 liter in a volumetric flask. Any other suitable cadmium salt, such as the sulfate, may be substituted if cadmium metal is not available.

The sample tubes and the standard tubes should be prepared at the same time as there is a notable deepening of tone when they are allowed to stand overnight. In doubtful cases, however, it is sometimes advantageous to allow the tubes to stand for a few hours before reading. Concentrations of cadmium as low as 0.02 mg./50 ml. may easily be distinguished by this method.

β-Naphthoquinoline Method

This method has been described for quantities of cadmium down to 1 mg.

Procedure:

Dissolve the cadmium by treating the sample with 50 ml. 2 normal sulfuric acid and 50 ml. 10 per cent sodium tartrate solution. Add an excess of a 2.5 per cent solution of β-naphthoquinoline. (Made by dissolving β-naphthoquinoline in N/2 H_2SO_4.) Precipitate the cadmium by adding a suitable amount of N/5 potassium iodide solution. Total volume about 150 ml.

The precipitate is filtered after 20 minutes, preferably by suction and sucked as dry as possible. It is washed with a solution obtained by adding 10 ml. of N/5 potassium iodide to 10 ml. of sulfuric acid-naphthoquinoline solution diluted with 90 ml. of water. It is best to add an additional 2 or 3 ml. of potassium iodide solution to the first two portions of wash solution in order to be sure of removing any excess acid in the precipitate.

The filter is now washed down with 20 ml. of 2 normal sodium hydroxide or ammonia, acidified with sulfuric acid, making the acid concentration about 5 per cent, and then titrating with N/10 potassium iodate solution. This may be done according to the method of Berg by adding practically an equal volume of acetone and using starch as the indicator.

Calculation:

1 ml. N/10 potassium iodate=0.9366 mg. cadmium.

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HYDROGEN SULFIDE

Hydrogen sulfide is encountered rather infrequently as an industrial chemical compared to its occurrence as a by-product of some industrial or natural process. It is a very toxic gas and the maximum allowable concentration for exposures not exceeding a total of 8 hours daily has been set at 20 p.p.m. parts of air by volume, by the American Standards Association in January, 1941.

Methods applicable to the detection and estimation of hydrogen sulfide include lead acetate test papers as used by the British Department of Scientific and Industrial Research, the silver cyanide detector developed by the U. S. Bureau of Mines, and the cadmium sulfide method. Other reagents for hydrogen sulfide include iodine, sodium nitroprusside, and p-aminodimethylaniline sulfate. The cadmium sulfide method is practical, accurate, and quite specific. It is recommended as the reference method.

Collection of Sample:

Two simple bubblers such as the petticoat type, in series, containing 10 per cent cadmium chloride solution are

used to collect hydrogen sulfide gas. Ammoniacal cadmium chloride solution or a slightly alkaline cadmium chloride solution may also be used with advantage. A single fritted glass bubbler operating at a rate of 0.5 to 1 liter per minute is also satisfactory, provided that a separate bubbler is used for each sample.

Procedure:

Transfer the contents of the bubbler with rinsings to a 250 ml. Erlenmeyer flask. Add a few ml. of sulfuric acid and titrate with standard iodine solution, using starch as an indicator. The solution may also be back-titrated with sodium thiosulfate after the addition of excess iodine solution. Add 5 ml. of .05 N iodine followed immediately by 2 ml. of acid. After 10 minutes back titrate with .05 N sodium thiosulfate.

Calculation:

1 ml. N/100 iodine=0.112 ml. of H_2S at 0° C. 760 mm. Hg.

An alternate method consists in comparing the amount of cadmium sulfide with standards of known sulfide concentration according to the method for cadmium as outlined above.

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F. H. GOLDMAN, PH.D., *Chairman*
ALLAN A. COLEMAN
HERVEY B. ELKINS
H. H. SCHRENK, PH.D.

III. Report of Subcommittee on Dust Procedures in Air Analysis

THIS committee makes no report for the current year but refers to its previous annual reports in *Year Books* 1936–1937, 1937–1938, and 1940–1941. New developments, provided they can be summarized in the form of a report, will be forthcoming in later reports by this committee.

J. J. BLOOMFIELD, *Chairman*
THEODORE HATCH
RICHARD T. PAGE
CHARLES R. WILLIAMS

IV. Report of Subcommittee on Bacteriologic Procedures in Air Analysis

THIS committee makes no report for the current year but refers to its six previous annual reports in the *Year Book*. The chairman has prepared a resumé of these six reports, with special reference to air disinfection, which is soon to be published elsewhere and reprints will be available, for which please address him, care Laboratories for the Study of Air-Borne Infection, The School of Medicine, University of Pennsylvania, Philadelphia.

WILLIAM F. WELLS, *Chairman*
ELIZABETH CHANT ROBERTSON, M.D.
C.-E. A. WINSLOW, DR.P.H.

Duties of Nurses in Industry

Public Health Nursing Section

THE industrial expansion occurring throughout the United States and the increasing understanding of the importance of the health of workers made necessary some consideration of the factors influencing the development of an industrial nursing program. For this reason the Public Health Nursing Section of the American Public Health Association at its 1940 Annual Meeting authorized the appointment of a special committee to be known as the Committee to Study the Duties of Nurses in Industry. This committee became active early in 1941 and planned a nation-wide industrial nursing survey. Such a survey was to serve as the basis (1) for determining the range of nursing activities included in all types of industrial nursing services, (2) for formulating a statement of recommended practices in industrial nursing, and (3) for defining the current problems confronting nurses in industry.

THE PRELIMINARY SURVEY

The committee decided before undertaking a survey on a nation-wide scale to do a preliminary survey. For this purpose a form and accompanying instructions defining the items on the form were prepared. During the summer of 1941 the form was used by committee members in 109 establishments which employed 235 nurses. Whenever possible the general plans for the survey and the practicality of procedures to be followed were discussed with the industrial nurse being interviewed and with the organized group of industrial nurses in the area, if such a group existed.

The results of the preliminary survey were presented in a progress report to the Public Health Nursing Section at the 1941 Annual Meeting of the American Public Health Association. At this time the Section accepted the several recommendations of the committee. The first recommendation was to continue the survey on a nation-wide scale since the report indicated that such a survey would be of sufficient value to warrant the effort, and the procedures as established seemed to be practical.

The second recommendation provided for the establishment of two committee groups, the Advisory Group, and the Working Group. A third group, the Consultant Group, was decided upon at a later meeting of the committee. The third recommendation authorized the committee to request the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, to guide and direct the survey and to assume the responsibility for the tabulation and analysis of the collected data.

ORGANIZATION OF COMMITTEE GROUPS

The *Advisory Group* was made up of representatives of organized groups of industrial nurses throughout the country. In some areas where the industrial nurses were not organized a

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COMMITTEE TO STUDY THE DUTIES OF NURSES IN INDUSTRY. Organized 1940. Published report: *Year Book* 1941–1942.

well known industrial nurse was invited by the committee to serve on the Advisory Group.

The functions of the Advisory Group were (1) to assist with the planning for and the conduct of the survey, and (2) to prepare recommendations of acceptable practices of industrial nursing based on the survey findings.

The appointment of the Advisory Group stimulated organizations of local industrial nurses' associations and afforded industrial nurses an excellent opportunity to plan for the development of practices in their own field.

The *Working Group* was composed of nurses on staffs of state health departments. The chief function of this group was the collection of data for the survey. In those states where a nursing consultant for industrial hygiene was employed, she was made responsible for collecting the data. In other states, arrangements were made for the staff of the division of public health nursing to accept this responsibility.

Serving on the Working Group afforded the consultants of the several divisions of industrial hygiene of the respective state departments of health an opportunity to become acquainted with the industrial nurses and the problems relating to industrial nursing in their respective districts. Likewise the nurses on the staff of the divisions of public health nursing who participated in the collection of the data acquired more knowledge of and greater interest in industrial nursing.

The *Consultant Group* was made up of representatives of the Council on Industrial Health of the American Medical Association, the American Association of Industrial Physicians and Surgeons, the American Industrial Hygiene Association, and the National Conference of Governmental Industrial Hygienists. Its function was to advise on all matters pertaining to the survey.

COMMITTEE ACTIVITIES

In general, committee and group activities were carried on through correspondence. However, several meetings were held, the first of which was held in November, 1941, and included members of the Advisory and Working Groups. At this time the form used in the preliminary survey was revised and plans were completed for conducting the survey on a nation-wide scale. Two other meetings were held in April and May, 1942, for the purpose of reviewing the progress made during the first two months of work and discussing problems encountered in collection of the data.

The final meeting of the Advisory Group was held in January, 1943, after the official termination of the activities of the committee as a whole. The group then prepared recommendations on acceptable practices of industrial nursing.

A report of the analysis of the findings of the survey data collected up to October, 1942, was given in a paper read before the Joint Session of the Industrial Hygiene and Food and Nutrition Sections at the 71st Annual Meeting of the American Public Health Association, St. Louis, Mo., October 29, 1942.

By official action of the Public Health Nursing Section, the committee was formally dissolved with the understanding that further study of the data was to be carried on at the National Institute of Health and the final report containing the recommendations to be prepared by the Advisory Group would be published by the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service.

RESULTS OF THE SURVEY AND RECOMMENDATIONS OF THE ADVISORY GROUP

NATURE AND SCOPE OF THE SURVEY

The committee was successful in ob-

taining completed schedules on 924 industrial establishments employing approximately 2,500,000 workers and located in 36 states and the District of Columbia. The information was collected through personal interviews with the plant nurse or other plant official by consultant nurses in the divisions of industrial hygiene, by staff nurses in several state departments of public health nursing, and by committee members. The survey was begun in March, 1942, and continued through December of the same year.

Eighty-four per cent of the plants were engaged in manufacturing and included a large number of essential war industries producing aircraft, ships, machinery, ordnance material, and clothing for the armed forces. Federal as well as private industries producing ordnance material were surveyed. The remaining 16 per cent of the plants were non-manufacturing industries and included coal mines, metal mines, construction projects, department stores, public utilities, insurance companies, banks, and several service industries.

The plants varied widely in size. Over one-half (58 per cent) of the industries with full-time nursing services employed from 500 to 2,500 workers. Sixteen per cent had less than 500 workers and 26 per cent employed more than 2,500 workers.

In general, the aim of the committee was to obtain as much data as possible on industrial establishments maintaining what is known as "nursing service." For this reason three distinct types of nursing service were sampled; namely, in plants in which the nursing activities were carried on by at least one full-time registered graduate nurse; in plants employing a registered graduate nurse on a part-time basis; and in plants in which such activities were carried on solely by non-professional personnel such as practical nurses or first aid attendants. Some of the non-professional personnel had completed Red Cross or Bureau of Mines first aid courses.

The first group of plants, those employing at least one full-time registered graduate nurse, predominated and constituted the chief group for purposes of the survey. Of the 924 plants surveyed, 868 were of this type and employed a total of 3,027 nurses. The National Survey of Registered Nurses showed that in 1941 there were some 6,000 industrial nurses in the country on both active and inactive status. Recent estimates indicate that in 1942 this number probably had increased to 9,000 or 10,000. If this figure is correct, the activities of approximately one-third of the registered industrial nurses in the country are covered by the survey.

The other two groups of plants were comparatively small. Twenty-two plants with part-time nursing service were surveyed. In 34 other plants, nursing service was rendered by practical nurses or first aid attendants.

FACTORS INFLUENCING RANGE OF DUTIES

The survey revealed that the duties of industrial nursing personnel ranged from "strictly first aid" to an all inclusive program embracing the present concept of health promotion in industry. Such activities include care and treatment of injured and ill workers, assistance with medical examinations, participation in health education programs, assistance with safety education and accident prevention, assistance with plant sanitation, participation in welfare activities, and home nursing services.

The nurse may be engaged in one or all activities pertinent to such programs. The extent to which she participates is determined not only by the attitude of the management toward health and welfare of employees, the differing occupational needs and health

requirements of workers, but also her own professional preparation, vision, and initiative.

When the type of medical service provided in the plant was considered, the analysis indicated that the responsibility delegated to the nurse was greater and her activities were more numerous in industries where the physician was on call than in those plants where the physician served part-time or full-time, particularly in the latter case. Physicians served full-time in 23 per cent of the plants surveyed, part-time in 37 per cent, and on call in 40 per cent.

When nurses' activities were correlated with plant size as determined by the number of workers, similar trends were observed but not to the same degree as in the cases of classification by type of medical organization.

Three other factors influencing the duties and responsibilities of the industrial nurse are (1) the provision for written standing orders or written procedures, (2) the type and extent of nursing supervision, and (3) the relation of the medical department to other departments in the plant organization.

WRITTEN STANDING ORDERS

It is a recognized principle that all nursing care should be given under the direction of a licensed physician. It will be noted that 77 per cent of the industrial nurses surveyed were employed in plants where the physician served part-time or on call, and hence it was necessary for the nurse to assume greater responsibilities. Suitable instructions in the form of written standing orders should be provided by the part-time or on call physician to insure satisfactory service during his absence. It is the responsibility of the nurse to secure such orders. Standing orders are a protection to the nurse, to the worker, and to the management.

Written orders outlining the procedures to be followed were provided for nurses in 42 per cent of the plants with full-time physicians, in 37 per cent of the plants having part-time physicians, and in 30 per cent of the plants where the physician is on call. Thirty-six per cent of all plants surveyed provided written standing orders for nurses.

Recognizing the serious import of these findings, the Advisory Group made the following recommendations. *Nurses working without the direction of a full-time physician should have written standing orders. Where no one physician is responsible for the plant medical service, the nurse may secure standing orders from the committee on industrial health of the county medical society.** Further, *the nurse working under the direction of a full-time physician should have written procedures for her guidance. In plants where non-professional workers are employed, written standing orders and/or written procedures should be furnished for the guidance of such personnel.*

SUPERVISION

While it was not possible to determine from the data the effect nursing supervision had on the extent or character of the nurse's participation in the plant services, undoubtedly this is a contributing factor. Provision for nursing supervision was reported in 48 per cent of the 420 plants employing two or more nurses. After consideration of this factor, the Advisory Group defined supervision as follows:

> Supervision is a democratic situation in which a person who has had opportunity to acquire a broad knowledge of her field and

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* Suggested written standing orders have been prepared by the Council on Industrial Health of the American Medical Association and have been made available to the component societies for the use of their state and local committees. Several state divisions of industrial hygiene have prepared suggested standing orders which are available to industrial nurses.

has proved her ability offers to share her knowledge and experience with another person in such a way as to help that person to do better work more easily and with greater satisfaction.

Believing in the importance of nursing supervision for industrial nurses, the Advisory Group recommended that *where two or more nurses are employed, one nurse be designated as one of the following, depending upon the size of the nursing staff and the amount of responsibility delegated to her: director of nursing service, nursing supervisor, chief nurse, head nurse, or charge nurse.* Further, *when the nursing staff of the particular industry is not sufficiently large to warrant the employment of a nursing supervisor, the facilities for advisory service offered by the state department of health or the insurance company should be utilized.*

As has been previously pointed out, the character and extent of nursing participation in the industrial health program is dependent upon the nurse's professional knowledge and understanding. One of the ways in which her professional growth and development can be fostered is through membership in professional organizations. Nurses should maintain their professional affiliations and be interested in keeping up with advances in their profession. The affiliations desirable are alumnae, district and state associations and the American Nurses Association, the local industrial nurses groups and the American Association of Industrial Nurses, the state organization for public health nursing, and the National Organization for Public Health Nursing.

RELATION OF MEDICAL DEPARTMENT

The relation of the medical (including nursing) service to other departments within the plant organization has considerable influence on the development of health service. To facilitate the effective operation of the medical department the person in charge should be able to discuss problems with top management. Management should consider its medical department as an asset rather than a luxury, or, as in some instances, a liability. It should be given the status which it merits on a par with operations. It was recommended that *the medical department, regardless of size, should be responsible to an executive of the organization.*

ACTIVITIES

The following summary is based on the analysis of the activities of 3,027 full-time registered graduate nurses employed in 868 establishments, irrespective of plant size or the prevailing type of medical organization. The recommendations concerning each activity were prepared by the Advisory Group.

Nursing care and treatment—Nursing care and treatment of occupational injuries and illnesses and emergency care of non-occupational illnesses was carried on by practically all of the nurses included in the survey. However, there were a few industrial nurses employed for mining and textile mill villages who gave no nursing care and treatment in the plant, but served the workers and their families in the latters' homes.

Hospital nursing may also be a function of the industrial nurse. Thirty-seven establishments operate their own hospitals. In all but two of these, nurses rendered nursing care to hospitalized workers and, at times, assisted in the plant dispensary.

In plants where a full-time physician is employed, the nurse's responsibility for care and treatment is limited to assisting the physician, or to the care of workers who do not need the attention of the physician. In plants employing a physician part time or on call, the nurse sees all workers who are injured

or ill and exercises judgment relative to medical treatment. She may administer the necessary care, give emergency care until the part-time physician makes his regular visit, or refer the worker immediately to a physician or to the hospital.

The importance of the nursing care and treatment phase of industrial nursing is frequently minimized by other professional groups. However, it requires professional competence, skill, and the exercise of judgment, particularly in plants where only part-time or on call medical service is provided.

Assistance with medical examinations—The second major activity of industrial nurses is assistance with medical examinations of workers. Over three-fourths, or 82 per cent, of the establishments did medical examinations of the workers either as a part of the preplacement or of the employment policy. This large proportion is accounted for by the fact that only those plants with some type of medical program were surveyed.

Practices differed as to where the medical examinations were performed. It was found that nurses assisted in 78 per cent of the 464 establishments which provided for medical examinations of workers at the plant, and in 10 per cent of the 250 plants which arranged for examinations at the physician's office, the hospital, or at some central clinic.

Although it would seem that a high percentage of the nurses assist with medical examinations, the data indicated that such assistance was frequently limited in extent. In some plants, nurses assisted with many of the following activities: taking the history, recording the findings of the physician, chaperoning female workers, testing vision and hearing acuity, measuring height and weight, taking readings of blood pressure, temperature, pulse and respiration, and taking specimens for serological and other laboratory tests. In other plants nurses performed only one or two of these activities. Apparently more adequate health services in industry could be provided by further utilization of nursing skills.

The nurse's assistance during the medical examination may aid the physician to secure the worker's understanding (1) of the value and use of the medical service, and (2) of the value of the examination and the procedure to be followed. In addition, her assistance will conserve the time of the physician.

It was recommended that *nursing assistance in the medical examination, both preplacement and other types, should include the following activities: (1) Interviewing the worker previous to the examination; (2) doing routine tests and explaining their significance; (3) taking specimens for serological and other laboratory examinations and explaining their significance; (4) interpreting to the worker plant policies regarding health and welfare and his responsibility for coöperation; (5) making periodic inspections for symptoms and indications of occupational diseases; and (6) making inspections and interviewing workers in connection with return-to-work permits.*

Nurses were called upon to do the urinalysis in one-half of the 370 establishments where physical examinations which required laboratory tests were made in the plant. The examination was usually limited to testing for sugar, albumin, and specific gravity. In 9 plants nurses performed the complete function of a laboratory technician and did serological and other indicated tests.

Although a large proportion of the establishments arranged for x-rays of workers when such were indicated, the survey showed that only 170 were equipped with x-ray equipment. In almost one-half (48 per cent) of these

plants the work was done by the plant nurse.

These data show that a fairly large number of nurses were engaged in special technical services not usually included in professional nursing preparation and for which trained technicians could have been secured. It was necessary for the nurse in these cases to learn the several technics before she could successfully perform the duties involved. The volume of work required, the physician's preference, and the attitude of the management toward the employment of technicians are some of the factors which determine the nurse's participation in these activities.

Since it is frequently necessary for the industrial nurse to do laboratory work, take x-rays, give physiotherapy treatments, make electro-cardiograms and basal metabolic tests, the Advisory Group recommended that *the nurse have special training in the technics of rendering each of these services when they are required of her. However, when the volume of special technical services requires the time of one individual, a technician rather than a nurse should be employed.*

Participation in health education program—Modern concepts of industrial health have perhaps wrought more changes in the field of health education than in any other aspect of the industrial health program. The survey indicated that nurses did very little health education work. However, the incompleteness of records and reports concerning such services rendered by the nurses prevented collection of reliable data on this activity.

Informal counselling with workers during the course of treatment, the distribution of health literature, and the follow-up of remediable physical defects were some of the specific ways in which nurses were participating in health education.

Organized health education programs were carried on in less than 20 per cent of the plants. These embrace preventive as well as promotional activities in the control of tuberculosis, syphilis, colds, and occupational diseases, and in the field of dental hygiene, mental hygiene, fatigue, and rehabilitation of the worker.

It is generally conceded that an industrial nurse has almost unlimited opportunity for health education and health supervision of industrial workers. The extent to which she takes advantage of this opportunity depends on her ability and understanding as well as on plant policies. Also in industries where a high occupational injury rate exists the volume of treatments may prevent the nurse from utilizing the opportunities for health education. Further, since the medical examination records are not available to the nurse in many plants, this obviously limits the amount and quality of health instruction she can give workers. Finally, a planned program for health education and supervision of workers comparable to the safety education and accident prevention program in force in many plants is essential if the nurse's participation is to be effective.

Conservation of the health of industrial workers in order to improve efficiency and lessen absenteeism is recognized as vital to production. Therefore, the Advisory Group recommended that *the nurse's participation in the plant health education program be extended and improved. Such a program should include definite plans for: (1) Follow-up for correction of remediable conditions; (2) supervision and rehabilitation of workers with adverse health conditions; (3) maintenance of complete records showing care given for non-occupational conditions; (4) health teaching in the training program; (5) utilization of community resources including private physicians, health and welfare agencies.*

Another health education activity is the teaching of formal classes. One hundred and ten nurses indicated that they taught regularly scheduled classes in home nursing, standard or advanced first aid. Frequently, not only workers but also their families enrolled in these classes.

Home nursing classes afford the woman worker an opportunity to improve her knowledge of general health and to gain an understanding of methods of caring for sick members of her family. First aid instruction makes the worker more safety conscious. It was recommended that *nurses in industry take the necessary steps to become authorized Red Cross Home Nursing and First Aid Instructors.*

Assistance with safety education and accident prevention—Although at times the nurse's conception of the extent of her activities in health education and promotion among workers was vague, usually little doubt existed concerning her part in the safety activities of the plant. In some cases she had complete responsibility for such activities; in other cases her duties were limited to the preparation of reports on accidents and to attendance at meetings. In 34 per cent of the 674 establishments which have organized safety committees, nurses participated as members. In fact, two of the nurses were safety committee chairmen, and 24 were secretaries. In another 5 per cent, nurses reported that, although not members, they attended meetings and often gave talks on safety education.

Nurses assisted actively in plant accident investigations in 41 per cent of the plants. They went to the scene of the accident, interviewed witnesses, and conferred with the foreman concerning recommendations for prevention of similar accidents. Fifty nurses reported voluntarily that they were responsible for the purchase, distribution, and maintenance of goggles, safety shoes, respirators, uniforms, and similar protective equipment.

The amount and character of the nurse's assistance with the safety education and accident prevention program is due in a large measure to the fact that provision is made through plant policy for such a program and that state laws and insurance company practices require adequate and complete records of compensable occupational disabilities.

It is recognized that many of the services now being rendered by nurses are not essentially nursing. However, the contribution which industrial nurses can make to the reduction in the rate and severity of accidents should not be minimized. Therefore, the Advisory Group recommended that *the nurse should not be responsible for the planning or direction of the safety program but that she assist in the following activities: (1) Proper placement of workers according to physical and mental fitness; (2) teaching the training course; (3) safety committee work; (4) record and report keeping; (5) individual instruction of workers regarding accident prevention; (6) visual education, movies, posters, and printed material; and (7) distribution and care of protective equipment.*

Assistance with plant sanitation—In industries where sanitary engineers are employed, the responsibility of the nurse is limited to the assistance of sanitary inspections of toilet, wash, rest, and change room facilities for women workers. Nurses in 9 per cent of the establishments surveyed performed this duty. In another 23 per cent, they also assisted with inspections of ventilation, lighting, and housekeeping facilities. Nurses assumed the complete responsibility for routine plant inspections in 5 per cent of the establishments. Many nurses reported voluntarily that they were responsible for the supervision of matrons when such

were employed, and likewise for the cleaning force.

It was recommended that *the nurse show an active interest in all phases of plant environment that affect the health and morale of the worker. However, direct responsibility for the supervision of plant sanitation should be delegated to other departments whenever possible.*

Participation in welfare activities—In general, the workers avail themselves of the opportunity to discuss their financial, marital, religious, and other home troubles with the plant nurse. Many plants provide a special department to handle the worker welfare activities. In such plants the nurse refers the problems to that department for further action. Otherwise, she may assume complete responsibility for welfare activities.

In addition, nurses indicated that they were responsible for the inspections of the cafeterias in 43 plants, and gave dietary advice to cafeteria managers in 13. The nurses managed the cafeteria or lunchroom in 8 plants, including the hiring and firing of workers, planning menus, and ordering of supplies.

Welfare activities in a plant are recognized as contributing to the morale and efficiency of the worker. Therefore, it was recommended by the Advisory Group that *nurses participate in and promote welfare activities. The nurse's participation may include: (1) Development of group sick benefits, hospitalization, and life insurance plans; (2) personal counselling with workers regarding welfare problems; (3) development of recreation program; (4) coöperation with local welfare agencies; (5) planning of cafeteria, lunch rooms and canteen services.*

Home nursing service—In 21 per cent of the establishments surveyed, nurses made at least 5 home visits a month, in addition to performing their duties in the dispensary. Additional nurses were employed for home visiting in 6 per cent of the plants. Among the reasons for making home visits are: (1) To give health supervision; (2) to determine eligibility for benefits; (3) to ascertain causes of absence; (4) to assist the worker with his social problems; and (5), less frequently, to give nursing care to the ill or injured worker. A few other establishments have arrangements with the local nursing associations or contracts with insurance companies for home visits. Three of the reasons for which visits are made to the homes of workers, namely, those to determine eligibility for benefits, to ascertain cause of absence, and to assist the worker with social problems, do not require the skills characteristic of nursing but may be essential to the service.

Home nursing care for injured and ill workers aids in the promotion of the general health, reduces absenteeism, and contributes to the morale of workers. The data indicated that this service is seldom rendered by plant nurses. However, when home visits are made by the staff of a nursing association, either through provisions of group insurance or arrangements between the plant and the association, the primary purpose for making the visit is to give nursing care.

Several factors make it more desirable for an industry to enter into a contract with a local visiting nurse association rather than to employ a nurse for home service. The travel time necessary for a nurse to make a special trip to the home of a worker who is commuting from a great distance makes the cost of such visits in time and money impracticable. In this connection the recognition on the part of industrialists of the need to avoid duplication of service—duplication of activities performed by a community agency in which they as responsible citizens of the community are interested—is of great importance. When this factor is

fully appreciated, industry will recognize the advantage of having the community nurse serve the plant for all home visiting, inasmuch as she may already be serving the family, and therefore is in a position to contribute her knowledge of family health problems to the industrial medical department.

After review of the data the Advisory Group recommended that *home nursing service be provided by the plant. The plan for visiting sick or injured workers in their homes should be developed to secure maximum benefits to the workers and to the plant. Employment of nurses for this service may be necessary where community resources are not available or cannot be coördinated with company policy.*

Records and reports—Another important function of the nurse is completing and filing records and preparing reports of first aid activities. All nurses keep records of treatments. Some are complete and others quite sketchy, depending on the requirements of the management and the nurse's own knowledge of such matters. The analysis revealed that nurses were given clerical assistance with their records and reports in 35 per cent of the establishments. Medical departments in the larger plants are usually staffed with full-time clerks and stenographers, relieving the nurse completely of this responsibility.

In 65 per cent of the establishments nurses were required to submit periodic reports on activities of the plant dispensary to the management or to the physician in charge. In 56 per cent of the plants nurses assisted with workmen's compensation reports.

Records and reports are to the industrial nurse what bookkeeping is to the accountant. They make it possible for her to prove to management the desirability of and the value derived from industrial nursing service.

It was recommended that: *(1) The medical records be kept strictly confidential except as interpretations of them are needed by management; (2) all medical records be kept in the medical department and available for use each time a worker presents himself for care; (3) when the physical examinations of workers are made outside the plant, the records or copies thereof be made available to the nurse; (4) clerical assistance be provided in order that the nurse's time may be conserved and records adequate.* Further, *the following types of records and reports are needed: (1) Daily record or log; (2) individual record including the medical examination, clinical visits, and the correction of remediable conditions; (3) disability absentee records; (4) compensation records and reports; and (5) monthly and annual reports to management.*

CURRENT PROBLEMS OF INDUSTRIAL NURSING

One of the objectives which the committee hoped to achieve through the survey was some insight into current problems of industrial nursing. However, when the original plans for the survey were made, the committee did not anticipate the war and the accompanying demands for nursing service which we are witnessing today.

The extent to which nursing services in industry have expanded is revealed strikingly by the survey. Of the 2,450 full-time registered nurses for which data were available, 40 per cent began their employment in 1942. Between January, 1940, and December, 1942, more than two-thirds, or 70 per cent, of the nurses began their employment. Thirty per cent were on their present jobs prior to 1940.

Thirteen per cent of the 850 plants for which data were available established nursing services for the first time in 1942. Thirty per cent of the serv-

ices were established during the last three years. It is interesting to note that only 7 per cent of the remaining plants established nursing services prior to 1915.

As a result of the unprecedented demand for graduate registered nurses in industry, numerous questions have arisen: What professional channels, if any, are utilized in the selection of these nurses? What qualifications are required? On what basis is salary determined? Are they employed to render services essential to the maintenance of the industrial health program? Is the nurse's time conserved wherever possible? What is the desirable number of nurses per unit of employees? Could a part-time nursing service meet the needs of the plant?

SOURCE OF SUPPLY

In the past many employers have not been aware of the professional channels through which nurses might be secured for positions in industry. Various sources have been used with the result that frequently the selection of the nurse has been made without giving proper consideration to duties and responsibilities of the position.

The Advisory Group recommended that *nurses for industry be obtained through professional nursing channels such as: (1) registries approved by local or state nurses' associations; (2) Nurse Placement Service *; (3) schools of nursing and universities offering courses in industrial hygiene; (4) insurance companies; and (5) divisions of industrial hygiene in state departments of health.* It was further recommended that *the local industrial nurses group act in an advisory capacity to the above organizations in regard to the needs of industry and nurses who are available.*

* 8 South Michigan Avenue, Chicago, Ill.

QUALIFICATIONS

In order to assist management and others interested in the employment of industrial nurses, desirable qualifications were enumerated by the Advisory Group as follows:

A. Personal
   1. An interest in, and an ability to work effectively with, all types of people
   2. Good physical health
   3. Emotional stability
   4. Initiative and good judgment
   5. Resourcefulness
   6. Ability to organize, especially where nursing supervision is not provided
   7. Ability to appreciate the importance of one worker's health to the efficient operation of the industry as a whole

B. Academic
   1. High school graduation
   2. Advanced education on a college level—desirable
   3. Ability to type for the purpose of record keeping—desirable

C. Professional
   1. Graduation from an accredited school of nursing connected with a hospital which had a daily average of 100 patients or affiliations with other schools of nursing which provide a broad clinical experience in medical, surgical, obstetrical and pediatric nursing
   2. Registration in the state of employment in accordance with the Nurse Practice Act
   3. Postgraduate study in industrial nursing with public health aspects—desirable

D. Experience

   Experience in hospital emergency room, out-patient surgical department, industrial clinic, and public health nursing—desirable.

It was recommended that *industrial nursing organizations make an effort to encourage the employment of nurses who have had the industrial nursing preparation which is available at the present time.*

SALARY

It seems logical to expect that the basis for salary (or compensation) should be the same as that for supervisors of departments, according to the

responsibilities involved and the qualifications and experience which are required. The Advisory Group recommended that *a job analysis be made to depict the responsibilities involved in the particular position and that the salary be commensurate with these responsibilities.*

ESSENTIAL SERVICES IN INDUSTRY

The National Nursing Council for War Service recommends [1] that industrial nurses who are not essential for maintaining minimum health services should serve with the armed forces.

It is considered that the industrial nurses who are essential for maintaining minimum health services are:

1. The nurses who have established health programs in essential industries
2. The nurses who are holding administrative or supervisory positions in the medical departments of essential industries
3. The nurses who have special skills or preparation essential to the maintenance of medical departments

In accordance with this policy the Advisory Group recommended that *staff nurses who are eligible for military service and who may be replaced by nurses not eligible for such duty should be encouraged to enroll for service with the armed forces and should be granted military leave.*

NON-PROFESSIONAL CLINIC ASSISTANTS

In keeping with the national effort to conserve nurse-power during the war emergency, it was recommended that *non-professional clinic assistants be employed in so far as possible, and that the following duties be assigned to them: (1) Securing of specimens and care of specimen bottles; (2) filling of hot water bottles and ice bags; (3) bed making; (4) sterilization of instruments and supplies; (5) assistance with dressings; (6) making surgical supplies; (7) care of change rooms, rest rooms, and toilets; (8) training of matrons.* It was further recommended that *there be written instructions governing the activities of the non-professional clinic assistants and that such assistants be supervised by the nurse.*

DUTIES OUTSIDE THE MEDICAL DEPARTMENT

The analysis revealed that the activities of nurses are not necessarily confined to the medical department. They range from selling telephone slugs and defense bonds to delivering babies. Nurses act as receptionists, relieve in the canteen or at the switchboard. They attend funerals and weddings, and write letters of congratulations and condolences. Nurses in 91 plants reported that they assist with the clerical and secretarial work in other departments of the plant, figure out wage rates and make out and distribute pay checks. In 30 plants they engage actively in personnel work, hire and fire employees, and keep worker employment records. In 25 plants nurses fingerprint and photograph employees and give identification badges.

In many instances when a nursing service is being initiated by industry the nurse combines with her nursing functions various duties unrelated to health services. Since it has been demonstrated that a plant employing as few as 100 workers can profitably employ a nurse full time, it was recommended that *the nurse's activities be limited to those of the medical department.*

NUMBER OF NURSES PER UNIT OF EMPLOYEES

The number of nurses employed should depend on the type of industry and the number of workers. For the maintenance of complete health service

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[1] *Priorities for Nurses.* National Nursing Council for War Service, 1790 Broadway, New York, N. Y.

in an industry it was recommended that *there be 1 nurse for up to 300 employees, 2 or more nurses for up to 600 employees, and 3 or more nurses up to 1,000 employees, 1 nurse for each additional 1,000 employees up to 5,000, and 1 nurse per each additional 2,000 employees. Additional nurses may be required because of hazards present in a particular plant and to supply service for second and third shifts.* This number will be reduced in inverse ratio to the number of technical and non-professional workers employed in the medical department. Smaller industries (those employing less than 500 workers) which do not have serious occupational hazards may find part-time nursing services adequate.

PART-TIME NURSING SERVICES FOR SMALL INDUSTRIES

Comparatively few employers have felt that full-time nursing service for less than 500 employees is a sound investment. It is being realized to an increasing extent that the number of employees cannot be used as a criterion of the need for an industrial health program. Rather the hazards associated with the working environment and the health problems of the employees are the deciding factors. Effective part-time nursing services have been developed in some cities to meet the needs of the smaller industries through utilization of community nursing agencies or through several plants sharing the services of one nurse. Frequently such part-time service has demonstrated the extent of service needed. In some instances the part-time service has consequently developed into a full-time service, and in other instances the part-time service has been adequate to meet the needs of the plant.

It was recommended that *the use of part-time nursing service should be extended, particularly in plants employing less than 100 workers.* It was further recommended that *local industrial nursing organizations coöperate with the state industrial hygiene divisions in giving guidance to individuals or agencies which may be utilized in providing such services.*

SUMMARY

The above report of the nation-wide survey conducted by the Committee to Study the Duties of Nurses in Industry serves as an initial attempt to define industrial nursing. Data concerning the nursing service were obtained from 924 industrial establishments employing approximately 2,500,000 workers and located in 36 states and the District of Columbia.

Of the 924 plants, 868, or 95 per cent, employed one or more full-time graduate registered nurses. A total of 3,027 nurses, or about one-third of the registered industrial nurses in the country, were at work in these establishments. Twenty-two of the remaining plants employed nurses part time, and 34 utilized only practical nurses or first aid attendants.

Duties of the full-time nurses were classified into eight general groups: (1) Nursing care and treatment of occupational injuries and illnesses and emergency care of non-occupational illnesses; (2) assistance with medical examination of workers; (3) participation in the health education program; (4) assistance with safety education and accident prevention; (5) assistance with plant sanitation; (6) participation in plant welfare programs; (7) home nursing service; and (8) records and reports. While these classifications serve in a general manner to delineate industrial nursing, a true definition of the profession will not be possible until further standardization of duties is achieved.

Recommendations of acceptable practices in industrial nursing have been made by the Advisory Group of indus-

trial nurses appointed to consider the reported data in light of their own knowledge and experience in this special field. Briefly, the major recommendations are as follows:

1. A nurse working under the direction of a full-time physician should have written procedures for her guidance. All other nurses should have written standing orders.
2. Where two or more nurses are employed, one nurse should be designated as in charge.
3. The medical department, regardless of size, should be responsible to an executive of the industrial establishment.
4. Nursing assistance in the medical examination, both preplacement and other types, should include six specific activities. (See page 870.)
5. When the volume of special technical services requires the time of one individual, a technician rather than a nurse should be employed.
6. The nurse's participation in the plant health education program should be extended and improved. (See page 871.)
7. Nurses should take steps to become authorized Red Cross Home Nursing and First Aid instructors.
8. The nurse should not be responsible for the planning or direction of the safety program but should assist in seven specific activities. (See page 872.)
9. The nurse should show an active interest in all phases of plant environment that affect the health and morale of the worker, but direct responsibility for the supervision of plant sanitation should be delegated to other departments whenever possible.
10. Nurses should participate in and promote worker welfare activities, especially in relation to five particular services. (See page 873.)
11. Home nursing service for workers should be provided by the plant.
12. Records and reports are to the industrial nurse what bookkeeping is to the accountant, and an efficient system should be maintained. (See page 874.)

The chief problems in the field of industrial nursing today have been brought about by the very rapid expansion of this service and the marked increase in the number of nurses employed in various war industries. Of the 2,450 full-time registered nurses who supplied the information, more than two-thirds, or 70 per cent, began their employment between January, 1940, and December, 1942. The lack of standardization already existing in this branch of the nursing profession, coupled with this increase in the number of nurses employed without previous experience or preparation, places a heavy responsibility on the comparatively small number of nurses practising in industry.

The Advisory Group, recognizing the serious import of these problems, has made recommendations which it is believed will promote the best interests of industrial nursing. The major recommendations may be briefly stated as follows:

1. Nurses for industry should be obtained through professional nursing channels only. (See page 875.)
2. A job analysis should be made to depict the responsibilities involved in a particular industrial nursing position, and a salary should be set for the position commensurate with these responsibilities.
3. Staff nurses who are eligible for military service and who may be replaced by nurses not eligible for such duty should be encouraged to enroll for service with the armed forces and should be granted military leave.
4. Non-professional clinic assistants should be employed, in so far as possible, to conserve nurse-power in performing eight specific duties. (See page 876.)
5. One nurse should be employed for up to 300 workers; 2 or more nurses for up to 600 employees; 3 or more for up to 1,000 employees; 1 nurse for each additional 1,000 employees up to 5,000, and 1 nurse for each additional 2,000. Other nurses may be required because of hazards present in a particular plant and to supply service for second and third shifts.
6. The use of part-time nursing service should be extended, particularly in plants employing less than 100 workers.
7. The local industrial nurses' organization should act in an advisory capacity to other professional groups and to state industrial hygiene divisions in regard to the needs in a local industry and the services of the nurses employed therein.

Incidental to the collection of the survey data, certain benefits accrued to the participating groups. The Working Group responsible for gathering the data acquired more knowledge of and interest in this field. Industrial nursing organization was furthered. Also, the nurses most vitally concerned with the development of industrial nursing were afforded an opportunity to plan for and promote their specialty through serving on the Advisory Group.

NOTE: The committee acknowledges with appreciation the work of Victoria Trasko, Assistant Statistician, National Institute of Health, U. S. Public Health Service, in doing the statistical analyses.

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Proposed Report on the Educational and Experience Qualifications of Laboratory Workers*

I. The General Scope of Public Health Laboratory Work

Historically the public health laboratory has been basic to environmental sanitation and to epidemiology, and it continues to be a most important fact-finding center of the health department. Because of the long-standing recognition of these functions, the public health laboratory may be regarded as among the most completely stabilized activities of health departments. Nevertheless, both the amount and the kinds of service expected of the laboratory have recently been expanded. Advancing medical discoveries are likely still further to enlarge the volume and the content of the program. It will be conceded that in almost every area of North America more laboratory service could be used with benefit to the public health program.

Extent and Coverage of Laboratory Personnel

The field of public health laboratory service now includes at least 1,300 workers in professional grades, according to a recent review of official agencies only. No satisfactory estimate is available of the number of professional persons engaged in private laboratories. The present membership of the Laboratory Section of the American Public Health Association is made up of somewhat over 1,000 members and Fellows. The proportion of these in various types of work was recently as follows:

	Per cent
Public health laboratory work	37
Clinical and hospital laboratory work	19
Academic work	22
Industrial laboratory work	13
Other types of service	9

As to duties performed by public health laboratory workers, there are listed herewith the functions of a public health laboratory and the duties of the workers are readily inferred.

II. The Functions of a Public Health Laboratory Include:

1. Bacteriologic, serologic, pathologic, chemical, and other examinations to aid in the diagnosis, control, and treatment of communicable and certain non-communicable diseases

2. Bacteriologic, serologic, pathologic, chemical, and other examinations associated with the diagnosis and control of diseases occurring among domestic and wild animals, and transmitted to man

3. Bacteriologic, chemical, microscopic, and other examinations of water, sewage, industrial wastes, shellfish

4. Examination of milk, frozen desserts, and other foods, drugs, liquors, narcotics, etc.

5. Production or provision of diagnostic, prophylactic, and therapeutic preparations, such as sera, antitoxins, toxins, vaccines, etc.

6. Research. Research is an important function of every public health laboratory. It is essential to the development of new and better methods for the control and prevention of disease, and promotes in the staff that critical attitude toward methods and results without which an acceptable standard of work cannot be maintained.

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* The Committee on Professional Education of the A.P.H.A. publishes this report before transmittal to the Governing Council in order to permit the members and Fellows of the Association to review it and to offer criticisms and suggestions in the further consideration of the report.

This report, like all other statements of the committee on professional and technical qualifications in public health, is subject to periodic revision in order that it may be kept abreast of the best thought.

III. The Educational Background

The basic preparation for public health laboratory work should essentially be professional preparation in bacteriology, chemistry, serology and/or parasitology, and in all cases the minimum training should be a college degree, with emphasis on at least chemistry, physics, and biology.

Promotion in responsibility should be based not only on experience but on the expectation that additional academic training will be secured. The ultimate balance between formal training and practical experience will have to be adjusted within each state or provincial system. In general, it is to be expected that an individual will make promotional progress through the classifications given below.

Outline of Training and Experience

In view of the diverse functions of a public health laboratory, the system should be so devised that an individual as he makes promotional progress toward the grade of Director should have:

1. Training in general biology
2. Advanced special training in one or more of the biological sciences, together with the training and the personal qualifications necessary for conducting research in one or more of them
3. Acquaintance with the biology of disease
4. Experience in a public health laboratory such as that described in this report
5. Administrative experience in the various divisions of the laboratory
6. Competence to interpret the place of the laboratory in the whole health program

Personnel Policies Encouraging Career Service in Public Health Laboratory Work

Regarding the titles of positions, it makes little difference what nomenclature is used in a particular laboratory system so long as training to the level of at least the baccalaureate degree is considered a minimum requirement. However, the term "technician" in related fields has so commonly been applied to persons who do not hold college degrees that it is desirable that the term be avoided in connection with the professional staff of public health laboratories.

Four levels have been provided in the classification of grades used in this report. Local conditions, however, may make it wise to provide a different number of grades. The exact number is immaterial so long as reasonable promotional opportunities are provided.

The unification within one system of all laboratory services relating to the protection of the public health is desirable, but at present only federal, state, and large municipal laboratories approach organization of this character. This report deals primarily with the larger laboratory systems. It is recognized, however, that most systems of laboratory service will contain smaller laboratory units with a staff of but one or two persons in whom must be combined several of the skills herein described. It is essential to have such smaller units incorporated into larger systems, such as that for a state, which will provide uniformity of standards and suitable promotional opportunities.

It is recognized that no single pattern can apply throughout North America, and it is well known that several states or provinces have well matured systems based on quite different patterns. It is not intended that these systems should be disturbed so long as they accomplish the purposes of high professional achievement. Rather it is desired to provide a broad framework for the guidance of interested persons in situations not enjoying the benefits of such established patterns.

This report should be thought of as a yardstick for a state, provincial, or territorial system of laboratory service, rather than as a pattern for an individual laboratory. It assumes that the

laboratory is a part of a well organized health department, operating under a modern merit system, and that the laboratory, together with all other divisions, is responsible for a well integrated service, both within the department and within the community.

IV. Qualifications for Various Grades of Laboratory Workers

The specific training and experience described below are regarded as the minimum qualifications for adequate laboratory service. These qualifications are not intended to be retroactive, but to apply to the selection of new personnel as positions become available.

A. Director

The director of a public health laboratory as defined in this report should possess those qualities of personality and character necessary to insure the honest and successful prosecution of scientific work. He should have an educational background in the biologic sciences at least equivalent * to the requirements for a doctorate in biological science, public health, or medicine as prescribed by a university belonging to the Association of American Universities or a medical school approved by the American Medical Association.

In addition he should have:

a. Five years' postgraduate practical experience and training in a laboratory of such size that experience may be obtained in the various biological sciences applicable to health and sanitary problems. Not less than two of the five years of postgraduate training and practical experience should have been devoted to training in general and special laboratory technics applicable to the recognition of disease in the human family and disease in animals transmissible to man, and in health and sanitary problems.

b. At least two years' administrative experience in a properly directed public health laboratory of such size that experience in the coördination of various laboratory functions may be obtained.

B. Assistant Director

He should have the formal educational qualifications outlined above for the Director. In addition he should have at least three years of practical experience and training in general and special laboratory technics as provided for the Director.

C. Pathologist

a. Principal Pathologist

He should have graduated from a medical school approved by the American Medical Association, and should have postgraduate training and experience equivalent to that prescribed for certification by the American Board of Pathology. Essentially this requirement is for five years of special training and experience after graduation from medical school, made up of an internship in an approved hospital, study of pathology for not less than three years in a recognized institution, and at least one year of further training or practice in pathology.

b. Associate Pathologist

He should have graduated from a medical school approved by the American Medical Association, and should have had not less than one year devoted to practical experience in the study of general and special human pathology and related medical subjects.

* The word "equivalent" as used in this report is for the purpose of assuring that, under special conditions, certain of the requirements relating to formal education may be waived, provided however that the qualifications of the applicant equal or exceed those specified.

D. Bacteriologist

a. Principal Bacteriologist (or Serologist)

He should have an educational background in biological sciences equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology, and at least two years' practical experience in a public health laboratory.

b. Associate Bacteriologist (or Serologist)

He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology, and at least one year of practical laboratory experience.

c. Senior Assistant Bacteriologist (or Serologist)

He should have an educational background equivalent to a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology.

d. Junior Assistant Bacteriologist (or Serologist)

He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or related sciences.

E. Chemist

a. Principal Chemist

He should have an educational background in biological sciences equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in chemistry and at least two years' practical experience in a public health laboratory.

b. Associate Chemist

He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry and at least one year of practical laboratory experience.

c. Senior Assistant Chemist

He should have an educational background equivalent to the requirements for a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry.

d. Junior Assistant Chemist

He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry.

F. Parasitologist

a. Principal Parasitologist

He should have an educational background in the biological sciences equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in parasitology and at least two years' practical experience in a public health laboratory.

b. Associate Parasitologist

He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology and at least one year of practical laboratory experience.

c. Senior Assistant Parasitologist

He should have an educational background equivalent to the requirements for a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology.

d. Junior Assistant Parasitologist

He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology.

TABULAR RESUMÉ OF TRAINING AND EXPERIENCE SUGGESTED FOR VARIOUS GRADES IN THIS REPORT

Position	*Essential Degrees*	*Major Academic Emphasis*	*Years of Prior Experience Essential*
Director	Doctorate in science, public health or medicine	Medical and biological sciences	5, with minimum of 2 years in a public health laboratory
Assistant Director	Doctorate in science, public health or medicine	Medical and biological sciences	3
Principal Pathologist	M.D.	Medicine and pathology	5
Associate Pathologist	M.D.	Medicine and pathology	1
Principal Bacteriologist	Doctorate in science, public health or medicine	Bacteriology	2
Principal Serologist		Serology	2
Principal Chemist		Chemistry	2
Principal Parasitologist		Parasitology	2
Associate Bacteriologist	Master's degree	Bacteriology	1
Associate Serologist		Serology	1
Associate Chemist		Chemistry	1
Associate Parasitologist		Parasitology	1
Senior Asst. Bacteriologist	Master's degree	Bacteriology	..
Senior Asst. Serologist		Serology	..
Senior Asst. Chemist		Chemistry	..
Senior Asst. Parasitologist		Parasitology	..
Junior Asst. Bacteriologist	Bachelor's degree	Bacteriology	..
Junior Asst. Serologist		Serology	..
Junior Asst. Chemist		Chemistry	..
Junior Asst. Parasitologist		Parasitology	..

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* Not voting to approve. See next page.

EXPLANATION OF NEGATIVE VOTE ON PROPOSED REPORT ON THE EDUCATIONAL AND EXPERIENCE QUALIFICATIONS OF LABORATORY WORKERS

The Proposed Report has my approval, except for the failure to include in the qualifications for a director the degree of Doctor of Medicine. It is my opinion that public health laboratories will continue to have increasing obligations in connection with clinical medicine; that a medical degree is essential background for a director in order that a public health laboratory may function adequately.

The question of requiring graduation in medicine as a qualification for laboratory directors in New York State was carefully considered several years ago by the Public Health Council of New York State, and in 1937 this requirement was enacted into a regulation. As a member of the Council I voted for this provision and as Commissioner approved the Council's action.

I have found no reason for changing my opinion since that time, and feel that it would be inconsistent for me to subscribe for any lower qualifications in a report to the Association.

Otherwise, the Report has my approval.

EDWARD S. GODFREY, JR., M.D.

Erstwhile Credit Lines

The Western Branch Meeting—1943 Style

Readers of the *Journal* will recall that the usual meeting of the Western Branch which was scheduled for May, 1943, was cancelled because of the lack of a suitable place and lack of man power sufficient to operate such a gathering of 800–900 persons at one time. Nevertheless there was a realization on the part of the officers of the Western Branch that there were more compelling reasons this year for an annual meeting than ever in order that the public health professions may continue to be informed about and integrated with the movement in this critical year. It was on this account that the American Public Health Association has satisfaction in having been able to organize substitute meetings to replace the Branch meeting, and by this means to reach many more of the workers themselves than would have been possible had the annual meeting been held in San Francisco as planned. The total attendance exceeded 2,850, mostly professional workers.

An invitation had been extended some months previously to Dr. Robert Hughes Parry, Medical Officer of Health of the City of Bristol, England, and Professor of Public Health at the University of Bristol, to be in the United States during the late spring, and it was possible to organize a series of meetings around this visit of Dr. Parry and the natural interest of all health workers in the experiences of those who have been through a severe blitz. Fortunately, Dr. Parry proved to be an ideal person for this interpretation to Americans and Canadians, and he was a delightful travelling companion for the team members who found it possible to attend some or all of the state and regional meetings which resulted.

With Dr. Parry was Dr. John L. Rice, immediate past-President of the A.P.H.A. and Commissioner of Health in New York City, 1934–1942; Dr. Erval R. Coffey, Assistant Surgeon General, U. S. Public Health Service, Washington, D. C., and formerly State Health Officer of Washington State; Dr. Don W. Gudakunst, Medical Director of the National Foundation for Infantile Paralysis, New York, N. Y., and formerly State Commissioner of Health in Michigan. Also Dr. Albert McCown, Medical Director of the American Red Cross, Washington, D. C., and formerly of the staff of the U. S. Children's Bureau; Dr. Nathan Sinai, Professor of Public Health of the University of Michigan; Dorothy Deming of the Merit System Unit, A.P.H.A., formerly General Director of the N.O.P.H.N.; and Dr. Edith Sappington of San Francisco, representing the U. S. Children's Bureau. For part of the meetings it was possible for Dr. Karl F. Meyer, Director of the George Williams Hooper Foundation, University of California, to be present. Dr. Meyer is President-elect of the Western Branch. Dr. Carl E. Buck, Field Director of the A.P.H.A. Committee on Administrative Practice, joined the team in California. Raymond Greenman, Field Representative, American Social Hygiene Association, for the Ninth Service Command, joined the group in New Mexico. Dr. Reginald M. Atwater, Executive Secretary of the A.P.H.A., directed the team. The programs were locally planned and carried out.

Dr. Parry had been in attendance at

public health meetings in Connecticut, Iowa, Kansas, Missouri, Indiana, Wisconsin, and New York prior to May 13 when the team left the East. The first meeting on the circuit was in Chicago, where the Illinois Public Health Association held an annual meeting. The arrival of the team was perfectly timed with the advancement of a new permissive health unit bill before the Legislature which is reported to have passed the Senate unanimously and, at this writing, is waiting for action by the House. This bill, sponsored by the State Health Department, will give Illinois legal opportunity for the first time to set up county units. A similar fortunate circumstance at Lincoln, Neb., made the visit of the team significant because a bill before the unicameral legislature was ready for a vote, and favorable action later followed.

Entering the territory of the Western Branch at Denver, the team enjoyed a stop of one day with public health workers of Colorado, where critical problems were brought out for consideration in a problem-solving panel in which the experience of the entire team could be mobilized. The attendance was at least as large as the usual meetings of the Colorado Public Health Association.

The next stop was at Albuquerque, where the New Mexico Public Health Association had a two day meeting, also well attended and generally agreed to have been unusually fruitful. A considerable number of the local staff had never had the opportunity to attend a Branch meeting or other larger gatherings of professional workers in public health, and the members of the team were left in no doubt as to the appreciation felt by the staffs in New Mexico.

The Arizona Public Health Association held a regular meeting of two days in Phoenix and it was said to have been the best attended of any meetings ever held by the state group. In these states it seems to have been true that at least ten times as many persons were able to attend as would have been able to get to San Francisco for the Branch meeting, even in a normal year.

The meeting of the Southern California Public Health Association was held in Pasadena under the Presidency of Charles Arthur, Health Officer of Pasadena, and was reminiscent to many of the annual meeting of the A.P.H.A. held in the same place in 1934. More than 500 were in attendance and the problem-solving panel in Pasadena boasted 12 participants, including Dr. W. L. Halverson, the new State Health Officer. There was no doubt of the success of the meeting, which in itself was larger than some recent meetings of the Branch in normal years.

Berkeley was chosen as the place for the meeting of the Northern California group, and nearly 500 registered during the two days of meetings, when local talent was used with the national leaders to cover a very dynamic field of interest in this most dynamic state. Here as in Albuquerque, Phoenix, Pasadena, and Seattle, the contributions made by Dr. Meyer and his consultants in medical research were particularly appreciated. A panel on medical care was an outstanding feature in Berkeley.

Subsequently meetings were held in Portland, Ore., in Seattle, Wash., and in Boise, Ida., for most of the team members. A later meeting of the Montana group in Bozeman was planned and some of the team were scheduled to attend meetings near the Mexican border in Juarez and El Paso during June.

Dr. Meyer, President-elect of the Western Branch, has suggested to some of the state meetings that this pattern of a travelling team may be useful for the future as an alternate for Western Branch meetings, which at best are a considerable distance from some parts

of the Branch territory. In a year like 1943 it was generally agreed that the team idea brought leaders in touch with local problems and gave local workers some inspiration more successfully than would have been possible with one meeting of the Branch in any available city.

An account of the blitz in Bristol as presented by Dr. Parry will become available shortly through the columns of the *American Journal of Public Health*, together with selected articles growing out of these regional meetings and bearing especially on the current problems of the professional worker.

The attention of A.P.H.A. members in the western states has been called to the circumstances under which the 72nd Annual Meeting of the A.P.H.A. and the War Conference will be held in New York City, October 12–14. The Executive Board has directed that there shall be no encouragement of travel for those at a distance greater than an overnight trip from New York, excepting for selected delegates who can systematically report on the War Conference to their colleagues. These state meetings have given an opportunity for the selection of these delegates and for early planning to avoid the difficulties of travel as they now exist.

Readers of Credit Lines will be interested in the impressions of the 1943 pattern of program and meeting as expressed by various members of the team:

Dr. Parry's Impressions

After two months spent in almost continuous travel and visiting among health workers in the United States, Dr. Parry was asked to summarize his impressions about his visit and about the health activities which he had seen. He said: "It makes an enormous difference to be a member of a party on such a tour as that which I have just taken across the States and back. This method puts one completely at home as he travels. I know that there are some thrills in travelling alone, but one can have one's fill of that. I prefer the pleasure of association with those of similar minds.

"You Americans make it easy for a stranger to make himself at home, even where there may be marked differences of opinion. It is the same knack of a lawyer who makes one confess beyond his intent. It reminds me of the lawyer who asked the man seeking damages for injury to his arm how high he could raise his injured arm and then to show the jury how high he could lift it before it was injured.

"I am impressed by the fact that you in America have accumulated all workers into an inclusive organization, the American Public Health Association. This is a unique Americanism. Neither the Royal Sanitary Institute nor the Society of Medical Officers of Health attracts the subordinate workers as you do here. The opportunity of meeting on a common ground and with those of comparable status seems to me very interesting and fruitful.

"You have here a striking enthusiasm for travelling long distances in order to attend meetings. Your concept of distance is different from ours. Travel of 100 miles seems to us enormous, while you think nothing of 2,000 or even 4,000 miles. I am a believer in the American attitude toward conferences.

"There is a vast difference between American administrative procedure and ours in England. Your executive officer seems to be so independent once he has the authority, whereas with us the executive acts as the agent or the servant of the committee. There are, of course, advantages as well as disadvantages in both methods. The authority of the public health officer here is much greater, but his individual re-

sponsibility is also greater and consequently there is a greater strain on your health officers.

"Security of tenure has different effects on different types of people. Security of tenure in office is not necessarily a good thing. In fact, nothing ever does take the place of selecting the right person for the job, either in your country or in ours. The wrong person with security of tenure is a greater menace to the service than he would have been without security, but the right man in the right post can do his work with a better heart and greater energy when he has security.

"However, the similarities between your health service and ours are equally striking. Your general attitude toward social welfare, the stress you lay upon the home, on environmental hygiene and on health education are all similar to our approach. But the way you serve your food and the natural advantages that you have for variety of food result in a more varied and satisfactory diet than ours in Britain."

Dr. Karl Meyer's Impressions

It will be no surprise to those who know Dr. Karl F. Meyer of San Francisco that his presence with the team in Albuquerque, Phoenix, Pasadena, Berkeley, and Seattle added much to the interest and value of the programs. His first hand familiarity with the medical problems of the West and his experimental approach to a great variety of conditions involving animals as well as man made it possible for him to throw valuable light on many of the questions asked of the panel. At least the other members of the team gained immeasurably from his contributions, and in this we think we were no different from the rest who attended.

Dr. Meyer was encouraged to set down some observations on the plan of using this team of travelling speakers instead of the conventional type of meeting. He said: "The very large attendance has made it possible to bring the message to many people and as a device this method compares favorably with the usual type of meetings. The programs this year had the character of postgraduate instruction of the refresher course type. Several persons told me that they found themselves definitely motivated by this program which used panel discussions prominently instead of the usual read manuscripts.

"The comradeship which was developed among the members of the team is one of the most treasured possessions to remember. I have never seen so diversified a group live so fruitfully with each other in spite of the confined space incident to travel this year and the other travel difficulties."

Dr. John Rice's Impressions

"There were four things that impressed me on the A.P.H.A. group western trip. First the eagerness and enthusiasm of the health workers in the various states — eagerness to keep abreast of public health in wartime and enthusiasm over the importance and value of the work they are undertaking. Second, the need for more money and more man power to make possible the wider application of our public health knowledge. Third, the need for strong leadership by the official state and local health agency. Fourth, the importance of the utilization of all available health forces in a united program. Such a program may well include federal assistance, that of the nonofficial agency as well as volunteer help.

"The experience of this trip raises the question in my mind as to whether or not this undertaking attempted as a war emergency procedure may not contain within it a technic of value for normal times for the promotion of public health and in holding closer together the component parts of the A.P.H.A.

"An extra premium resulting from this trip was the extension of the feeling of confidence and understanding between the various agencies through their representatives on the tour. Besides this, public health in England and the United States moved closer together through Dr. Parry, the representative from Bristol, England."

Dr. McCown's Impressions

"My overall feeling at the end of this trip is one of gratification and satisfaction that the American Red Cross was invited to participate with this group of outstanding public health leaders in their visit to meetings of public health associations in ten states. It gave the Medical Director of the American Red Cross an opportunity to meet health officials in several states and to discuss with them the channels of better integration of the health activities of local chapters of the American Red Cross with the local health departments.

"Everywhere I sensed a realization that in these emergency times there should be close coöperation. In their health activities the Red Cross Chapters need sound medical advice, and in community activities the well organized local health department should be equipped to render such advice. Through their various training programs the local chapters of the Red Cross have trained large numbers of volunteers in first aid, nurses' aids, home nursing, and nutrition. This group constitutes a tremendous backlog of individuals who have shown their awareness of health needs and, through participation in training courses, their desire to be of service. It would seem desirable therefore that through local consultation and agreement between the health agency and the local chapter of the American Red Cross, these volunteers, having been trained, may be given an opportunity to serve.

"A feature of special interest was the round table conducted at the meeting of the Northern California Public Health Association in Berkeley on medical care, which was organized by Milton Rose, M.D., Medical Director for the Pacific Area of the American Red Cross, who acted as chairman.

"On the personal side, the Director found a spirit of genuine coöperation and friendliness and had an opportunity to make lasting new friendships and to cement old ones. It was a privilege to come to know, in the intimate contact of a three weeks' tour, the distinguished but modest and lovable visitor from Bristol, Dr. Robert Hughes Parry.

"It was specially appropriate that the agency which arranged this series of meetings was the professional society of public health workers, and the representative of the American Red Cross wishes to express his appreciation of the splendid way in which the trip was organized and managed."

Miss Deming's Impressions

"To me the most outstanding feature of these state-level national meetings was the presence of local lay people. Non-professional leaders in community life who would never travel to a national convention or even to a Western Branch meeting, heard their own home problems discussed by representatives from the federal government, the American National Red Cross, and five voluntary national health agencies. It was a chance to take their questions 'right to the top' without spending even postage putting themselves on record. The informality and good natured interchange among the experts in all the discussions made for friendly feeling and promoted the impression that the nationals were after all 'just folks,' trying to pull together for the good of all, especially for the people in the state in which they were meeting. Citizens learned quite a lot about how

their way of doing things stacked up against the best standards, and more than one person in the audience heard something entirely new about his local health department for which he was paying taxes.

"As a membership promotional device I cannot think of a better! One elderly nurse said to me, 'I've been a member of the A.P.H.A. for ten years, but this is the first time I've ever been able to get to one of your meetings. I live three hundred miles away. I'll always remember this meeting—(she referred to a particularly lively round-table discussion)—I got my question answered!'

"I think it should also be said that the ten or more staff representatives of the national agencies travelling together did quite a little housecleaning! Questions as to certain national policies of each agency—long misunderstood or misinterpreted, got cleared up, and once in a while one would hear an exclamation, 'That's a good idea! We ought to do that,'—or, generously, 'You're absolutely right. We don't go about that in a constructive way.'

"Many people spoke of the practicality of this plan of meeting, pointing out the saving of expense in combined staff travel (taxi service for example), the conveniences to the local hosts in entertaining a group instead of successive national visitors, and the chance for small conferences with several national representatives at once.

"All agreed that the down-to-the-bedrock level of the discussions of local questions, as compared to the over-all generalizations necessary in regional or national meetings, was a joyful relief. It should also be said that frequently the question as to a specific, factual situation existing four blocks away was harder for the visiting team to answer than the glib quoting of an accepted policy applicable anywhere in the United States.

"Finally, I am sure the impression left on the local groups is invaluable as an asset of good will—that the A.P.H.A. is ready to come to them when they cannot come to New York, that it has had the courage to experiment with a new 'way of life' in annual meetings and that it is able to bring together a group of health workers worth listening to, helpful—and in the case of Dr. Parry, our drawing card—inspiring."

Bristol's Method of Treating Verminous Heads

Considerable interest was expressed at the meetings addressed by Dr. Parry in the method which he described for treating lousiness, especially among school children, which was developed during the battle of Britain. The method adopted by his department is described in a memorandum dated June 25, 1942.

A single application of 40 per cent lethane brilliantine is thoroughly applied to the hair, followed one week later by a thorough soap and water washing. Immediately after washing, the hair is dampened with dilute acetic acid and combed to remove all dead nits. There is evidence that this method will not only clear the head of vermin but will protect from further infestation for at least a week.

The lethane brilliantine solution formula is as follows:

40% solution lethane 384 special	32 oz.
Liquid paraffin lev. ad	½ gal.

The lethane is a derivative of arsenic preparations made in the United States and shipped to Great Britain for use as insect sprays.

Bristol's Method of Treating Scabies

A similar memorandum to doctors and nurses quotes from a publication of the Ministry of Health on the treatment of uncomplicated cases of scabies,

as well as the disinfestation methods and rules for exclusion from school.

Treatment—Scabies can be efficiently treated either with sulfur ointment or with benzyl benzoate. Benzyl benzoate emulsion (25 per cent) is the preparation of choice, and for uncomplicated cases of scabies the treatment of patients during the present emergency should be standardized as far as possible:

(a) The patient is first given a slipper bath in which he is told to soak for 10 minutes; alternatively a shower bath for 5 minutes would suffice. He then soaps himself freely using, if necessary, a rough flannel but not a scrubbing brush, and rinses the soap off.

(b) The patient is then dried and, in a room adequately warmed, benzyl benzoate is applied over the whole body, from the neck downward, with an ordinary flat paint brush 1½–2 inches wide. The application is allowed to dry and the patient puts on clean underclothes.

(c) Two such treatments should be given, either on successive days, or within a period of 8 days.

Where a case of scabies occurs in a house, the whole family should, if possible, be treated at the same time.

Disinfestation — Clothing, particularly clothing worn next to or touching the skin, and articles of bedding with which a patient comes in contact, such as sheets or blankets, should be properly disinfested if the necessary apparatus is available. Otherwise, underclothing, towels and sheets at least should be washed and aired and outer clothing ironed with a hot iron. Blankets may be ironed or hung in a warm dry place for 2 days.

Exclusion from School—After the first treatment with benzyl benzoate there is no medical reason for excluding an uncomplicated case of scabies from school.

The formula for the benzyl benzoate solution is as follows:

Benzyl benzoate	25 gm.
Lannette Wax SX (emulsifying agent)	2 gm.
Water	100 ml.

BOOKS AND REPORTS

Doctor in the Making. ***The Art of Being a Medical Student—By Arthur W. Ham and M. D. Salter. Philadelphia: Lippincott,*** **1943. 179 pp. Price, $2.00.**

This admirable little book is the result of investigations by a committee of the faculty of the University of Toronto, the object of which was to determine why the records of certain students were not reasonably in accord with the predictions based on their aptitude tests and their scholastic records. There were enough examples of discrepancy between prediction and accomplishment to show that ability and academic preparation do not guarantee success. As a result of the inquiry the committee became advisory rather than investigatory. The authors point out that the amount of information placed before the medical student of today is appalling and the steady stream of knowledge can be mastered only by a mind skilled at learning. This seems to be the first instance in which a university has recognized the duty of teaching students to become competent students in addition to teaching them how to become competent physicians.

The authors are evidently masters of their subject and every page contains good advice. They stress the value of premedical sciences regardless of the field of medicine the student wishes to pursue. They have the faculty of putting things straight from the shoulder. For example, "Knowing an anatomy textbook by heart does not make a good anatomist any more than memorizing the Bible makes a good Christian." We wish space allowed many more quotations. There is much in the book that the professor should take to heart also. A good example of this concerns the organization of one's total knowledge with each bit in its proper compartment. This may become almost a disease, and such people, including some doctors, "do not hold conversations with their fellow men—they deliver lectures." "The signs of this disease are an ability and a willingness to bore people with long discourses on all subjects."

Much of the book is summed up in Part Three. The authors lay stress on the responsibility of every medical student to become a cultured civilized person in addition to being well versed in the medical sciences. It is the duty of medical schools to help in the cultural development of their students. Some schools have already added some subjects in arts courses for this purpose, though the already crowded curriculum makes it difficult. On the last page is a charming tribute to the old-fashioned country doctor who was respected for his humanity as well as his tolerance. Though "he was suspected of believing in evolution and known sometimes to consort with sinners, he was nevertheless beloved and respected."

The illustrations are excellent. It is hard to commend this book too highly both to students for whom it is written, and to professors. The one criticism is that short as it is, it is still too long for the average student with his crowded curriculum and the many outside activities often forced on him.

MAZŸCK P. RAVENEL

Manual of Industrial Hygiene and Medical Service in War Industries ***—By Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, William M. Gafafer, D.Sc., Editor. Philadelphia: Saunders,*** **1943. 508 pp. 20 ill. Price, $3.00.**

This timely and important manual

on industrial hygiene is the result of the joint efforts of 16 specialists of the National Institute of Health. It was prepared at the suggestion of the Committee on Industrial Medicine of the Division of Medical Sciences of the National Research Council. It is designed as a source of current and reliable information for industrial physicians, industrial engineers, industrial hygienists, and others who are interested in this highly important, rapidly expanding, and scientifically complex field of public health endeavor.

It is estimated that in 1943 there will be 22 million essential war workers and 18 million others who will be contributing to their basic requirements for healthy living such as food supply, housing, transportation, public utilities, etc. The satisfactory health of those industrially employed has never been of greater importance to the national welfare. The problem has been aggravated by the removal of medical and engineering personnel from industry for direct military service and by the crowding, poor housing, inadequate schools, recreation, and other welfare services, increased mental and nervous strain, increased fatigue, and the introduction of new and serious hazards that have attended the industrial expansion of the national war effort.

Industrial health touches the life of the community in all of its aspects. It cannot be solved by industry alone. It is the joint responsibility of the industry and the community. Unfortunately, it has been a relatively neglected field of public health endeavor. The rewards of intelligent, consecrated efforts on an extensive scale in the field of industrial health should be reflected in increased longevity, prevention of communicable disease, prevention of accidents and resulting disabilities, curtailment of absenteeism, and promotion of sound nutrition, good medical, dental, and nursing care, sanitary housing, satisfactory environmental sanitation, and positive health.

The book is divided into three parts. Part 1 deals with the organization and operation of the medical, nursing, dental, and emergency treatment facilities necessary for industry. Part 2 deals with the prevention and control of disease in industry and includes chapters on occupational diseases, occupational dermatoses, control of the atmosphere in the working environment, control of respiratory and venereal diseases, industrial psychiatry, industrial fatigue, health education, nutrition, and community as well as plant sanitation. Part 3 deals with the man power problem including the maximum use of man power, women in industry, and absenteeism.

The book is a splendid contribution to essential working knowledge in the field of industrial health work. It can be highly recommended as authoritative, as exceedingly useful, and as of the utmost importance to the success of the national war effort.

MURRAY P. HORWOOD

The Pasteurization of Milk—*By G. S. Wilson. New York: Longmans, Green,* 1942. 212 pp. Price, $5.00.

The author, a professor of bacteriology as applied to hygiene, University of London, has described the chief physical, chemical, and bacterial changes brought about by the pasteurization of cow's milk in equipment designed to hold it at about 145° for 30 minutes. The effect of pasteurization on the nutritive value of milk, milk taste, cream line, fertility of animals fed on a milk diet, the destruction of pathogenic organisms, and the extent of milk-borne disease is described in meticulous detail.

The 10 page bibliography is one of the best ever seen on subjects related to why milk should be pasteurized and why pasteurization should not be ob-

jected to, and it indicates the extent to which the author has gone to secure information from available sources in all parts of the world.

There is much repetition in the book but this does not detract from its value. The summaries at the ends of sections or parts thereof are useful.

There is little useful information in the book as to *how* milk should be pasteurized. It can be recommended as good reading for all people who oppose pasteurization and all who wish to review the literature in connection with the historical background of the subject. The book would probably not be particularly useful to the sub-professional health worker unless he wishes to refurbish his repertory of arguments in favor of pasteurization. E. C. GARTHE

Social Work Year Book 1943—*Russell H. Kurtz, Editor (7th issue). New York: Russell Sage Foundation,* 1943. 764 pp. Price, $3.25.

Here is a time-saver for the health officer or other administrator in public health, who, busy though he may be with his daily tasks, nevertheless desires to keep abreast of new knowledge and developments within the various areas of his own general field of interest and in closely related fields. This is how the volume would help him to do that:

It reports succinctly in a series of articles the current status of organized activities in particular areas in the field of public health, and each such article is written by a recognized leader in his or her specialty. These particular areas are Tuberculosis, Social Hygiene, Maternal and Child Health, Social and Health Work in the Schools, Mental Hygiene, Medical Care, Medical Social Work, Crippled Children, Blindness and Conservation of Sight, the Deaf and the Hard of Hearing, Psychiatric Social Work, Public Health Nursing, and one on Public Health generally. Further, there are articles on topics that have much in common with the public health movement, such as the following: Housing and City Planning, Behavior Problems, Adult Education, Parent Education and Child Development, Publicity and Interpretation in Social Work, Rural Social Problems, Labor Legislation and Administration, and Community Organization for Social Work.

The book contains two major divisions: Part One, consisting of 78 signed articles, written by authorities on the aforementioned topics and many others in social work, in a comprehensive meaning of that term, with a list of selected references to the literature of each of these subjects; and Part Two, consisting of 4 directories of national and state governmental agencies and national and state voluntary agencies, whose programs are concerned with or relate to the topical articles constituting Part One.

The *Social Work Year Book* is issued biennially, and this is the seventh of the series. Quite naturally this 1943 edition emphasizes the important events and developments that have occurred in the two year period since the preceding edition was issued, especially those relating to the national defense and war programs.

The volume is excellently indexed. The Index includes in a single alphabetical list the titles of the 78 topical articles in Part One, cross-references to subjects discussed in these articles, names of the governmental and voluntary agencies included in Part Two, and cross-references to the subjects with which these agencies are concerned.

Your reporter believes that the objective of the publisher and editor has been abundantly realized—the presentation of a concise up-to-date encyclopedia of work in the fields of social welfare, public health and kindred mat-

ters—and he recommends that health officers and other health work executives find a place for it on their desks as a ready, convenient source of current information on many subjects with which they are concerned and on others in which they are or may well become actively interested.

It is the opinion of the reviewer that the title of the volume is not adequately descriptive of the breadth of its contents, for the term "Social Work" is still quite narrowly interpreted by many persons as relating chiefly to the case work process for dependent, neglected, disadvantaged, and delinquent individuals and families. He is disposed to believe that more persons would be induced to acquire this excellent compendium of information if a more broadly descriptive title could be found for it. GEORGE J. NELBACH

The Epidemiology of Rheumatic Fever and Some of Its Public Health Aspects—*By John R. Paul, et al. (2nd ed.) New York: American Heart Association,* 1943. 163 pp.

In this monograph Dr. Paul presents a lucid review of the literature of the past decade regarding the epidemiology of rheumatic fever and its public health aspects. American, British, and Scandinavian publications have been included, as well as his own extensive investigations.

The thirteen chapters are presented in three parts. In addition there are an appendix and a selected bibliography. In Part I, a concise consideration is given to definition and nomenclature in the first two chapters, as well as a brief historical review of the epidemiology of rheumatic fever. In chapters 3 and 4 is documented the evidence for the "Epidemiological Associations Between Rheumatic Fever and Acute Hemolytic Streptococcal Infections," concluding in a general summary, part of which follows:

> As one looks broadly at present concepts of the relationship between streptococcal infections and rheumatic fever, which have been reviewed in the last two chapters, it seems obvious for clinical, immunological, and epidemiological reasons that hemolytic streptococcal infections have something to do with rheumatic fever. The strongest evidence in this association is the fact that certain epidemics of so-called streptococcus sore throat, tonsillitis, and perhaps scarlet fever are followed more or less irregularly by groups of cases and even "epidemics" of rheumatic fever.

In Part II, chapters 5–9, there is presented a critical review of some of the most important epidemiological aspects of the disease, comprising the following considerations:

Chapter V. The Frequency of Occurrence and General Importance of Rheumatic Fever
Chapter VI. Geographic Prevalence and Climatic Influences
Chapter VII. Age, Sex, and "Racial" Prevalence
Chapter VIII. Living Conditions
Chapter IX. The Rheumatic Family

In Part III there is a timely consideration of the public health aspects of rheumatic fever, with a general summary. Also included are a chapter on "Lines Along Which Public Health Procedures May Develop," by Dr. David D. Rutstein, and a chapter by Dr. T. Duckett Jones on "General Considerations for the Long-term Care of Patients with Rheumatic Fever and Rheumatic Heart Disease." In an excellent, concise general summary, the following provocative concept is of particular interest:

> Most of the general statements which appear in this review . . . are based on the assumption that rheumatic fever is a specific disease, or clinical entity. There is room for argument as to the validity of this assumption, particularly as it has been repeatedly brought out in this review, that rheumatic fever is a disease which is closely related to hemolytic streptococcal infections.

The appendix, "Special Methods for Use in the Study of the Epidemiology

of Rheumatic Fever and Its Public Health Aspect," is an important contribution to the value of the volume. Particularly helpful is Dr. Thomas D. Dublin's section on the "Methods of Determination of Incidence and Prevalence of Rheumatic Fever."

This monograph is a much needed addition to the literature on rheumatic fever and will be welcomed by students of the disease. MAY G. WILSON

The Freezing Preservation of Foods—*By Donald K. Tressler, Ph.D., and Clifford F. Evens, B.S. New York: Avi Publishing Co.*, 1943. 763 pp. Price, $8.00—Domestic, $8.25—Canada and foreign.

The present volume is essentially a greatly enlarged and improved rewriting of the authors' book *The Freezing Preservation of Fruits, Fruit Juices and Vegetables* which was written six years earlier, and contains a vast amount of new material. Since that time great progress has been made in the application of freezing to all classes of foods, and this volume deals with principles and with practice. In its 21 chapters it covers the theories and the technical aspects of freezing fruits and fruit juices, vegetables, meats, fish, shellfish and dairy products, and discusses in considerable and careful detail the problems concerned with locker plants, packaging materials, nutritive values and vitamin retention, the cooking and serving of frozen foods, and finally a concise treatment of quality control.

An appendix of approximately 70 pages gives the standards and official methods of testing this important class of food materials.

Altogether this work is cyclopedic in scope and represents an enormous amount of work, both original and bibliographic, on the part of the authors. The first three chapters cover in less than 100 pages the principles of refrigeration and the detailed description of equipment used in different freezing systems. This is presented in a generally clear manner and is especially useful to one who wishes to gain a broad overall picture of modern freezing processes, cold storage, sharp freezing, and especially quick freezing.

The chapter dealing with chemical changes in foods before freezing, while in the chilled state, and after thawing, is particularly well presented. One cannot help expressing admiration for and satisfaction with the factual material given in the chapters on the preparation and adaptability of foods for freezing and the details of the actual freezing process.

As a reference book this volume should be on the shelves of every food technologist, and of every health official or health laboratory director who is concerned with the bacteriological problems of frozen or cold storage foods.

The illustrations are excellent, print easily readable, and paper without annoying gloss. It is a good book and an imposing addition to the literature of food technology. S. C. PRESCOTT

Essentials of Nutrition—*By H. C. Sherman and Caroline Sherman Lanford. (2nd ed.) New York: Macmillan*, 1943. 442 pp. Price, $3.50.

This excellent small and up-to-date volume can be recommended unreservedly for the use of public health personnel. The reviewer has frequently recommended it to non-medical friends who ask that they be directed to an informative book on nutrition that will stick to facts and not go all out on the propaganda side. Such a reader would find this book stimulating, though possibly difficult or dull in some places. But he would not emerge from its perusal with any misinformation, and would certainly acquire a profound respect for the rôle of adequate nutrition

in life and health. Dr. Sherman is an advocate of the abundant life in this nutrition question. The standards set up for adequate nutrition might be considered rather luxurious and unattainable by the great majority of the human race. They do represent the ideal, and an attainable one in our nation.

The book is primarily designed for students in nutrition classes, with exercises and suggested readings at the end of each chapter. It follows the usual order of presentation—energy aspects of nutrition, proteins and their amino acids, mineral elements in nutrition, and finally the vitamins. These four aspects of nutrition are preceded by three introductory chapters on the rôle of food in life, and some discussion of metabolism; and the book closes with four special chapters on food and teeth, types of foods, food costs and values, and "Nutrition Policy: Public and Personal."

This last will be of particular interest to public health personnel. Dr. Sherman pleads for the optimum rather than the merely adequate in nutrition and emphasizes the "difference between merely passable health and buoyant health." Both the economic and the educational approaches to this problem are outlined, and some questions of statesmanship discussed.

One of the most valuable features of this volume is the 27 page table at the back on the composition and nutritive value of foods. With its use one can calculate the content of the several nutrients in an individual diet. Practice in the use of this table would be valuable to every member of a health department, all of whom should be informed health educators for better nutrition.

D. F. MILAM

Principles of Medical Statistics—*By A. Bradford Hill (3rd ed.) London: Lancet*, 1942. 189 pp. Price, $2.25.

The third edition of Dr. Hill's book differs in no material respect from the previous edition. As the author states in the preface to this latest edition "Preoccupation with some of the statistical problems of total war and the national urgency to save paper have made any (such) expansion impossible and I have confined myself to a few verbal alterations."

For the medical man with little or no knowledge of statistics, Dr. Hill's book serves as one of the best introductions to the subject. Even for those who have had some statistical dealings its clear exposition of the logical principles involved in the ordinary statistical procedures deserves a careful reading.

PAUL M. DENSEN

Healthy Babies Are Happy Babies—*By Josephine Hemenway Kenyon, M.D. Boston: Little, Brown*, 1942. 343 pp. Price, $1.50.

This is the third edition of Dr. Kenyon's book by this title and changes have been made which bring it up-to-date in many respects. The newer fish liver oils, vitamin concentrates, sulfa drugs, and non-profit hospital service plans are touched upon. The full discussions of habit training and physical and mental development are, for the most part, in accord with modern concepts. But nutrition is not the author's forte. There is insufficient discussion of the basic principles of nutrition to enable parents to make the best use of the sample menus with their many substitutions.

The organization of the material in chapters relating to age levels from the prenatal period to the age of three years makes it easily accessible. Discussions of the health of the mother are woven into each section.

The chapters on emergencies and diseases of childhood are well done and are timely now that mothers must assume more responsibility for minor illness due to the doctor shortages.

JESSIE M. BIERMAN

Venereal Disease, Diagnosis, Treatment and Laboratory Methods—*Department of Pensions and National Health, 111 Avenue Road, Toronto, Canada.* 98 pp.

This pamphlet was prepared by a committee of thirty-two physicians convened by the Health League of Canada. The names of the members of the committee guarantee the soundness of the contents of the report.

The volume is a handbook for physicians who treat venereal diseases. It gives the essentials of the diagnosis and treatment of these diseases. On account of the limitations of space many details are omitted but if every physician treating syphilis, gonorrhea, chancroid, lymphogranuloma inguinale and granuloma inguinale could be familiar with and apply all that is given in this brochure the treatment of these diseases would be on a very much higher plane than it occupies at the present time.

As might be expected there are some statements made with which many authorities would not agree. There is given a prescription for an astringent urethral irrigation which, in the opinion of many urologists, has no place in the treatment of gonorrhea. It might have been better to omit the details of the intermittent treatment of early syphilis, but in fairness to the committee it should be stated that it does not recommend the intermittent treatment.

The booklet is to be recommended to all physicians who are called upon to treat the venereal disease.

F. L. ROBERTS

A Study of Patients Discharged Alive from Tuberculosis Sanatoria in 1933—*By Jessamine S. Whitney and Mary V. Dempsey. Social Research Series—No. 8. New York: National Tuberculosis Association,* 1942. 58 pp. Single copies free.

This study represents a joint effort of the National Tuberculosis Association and the Division of Vocational Rehabilitation, U. S. Office of Education. The purpose of the study is "an attempt to answer the question, 'What type of patient who has had sanatorium care is feasible for and will profit most from intensive organized service?'" Seventy-five public sanatoria in sixteen states and the District of Columbia voluntarily coöperated in the undertaking.

Some of the difficulties to be encountered in a problem of this kind are discussed, and one very important section of the report deals with recommendations prepared as the result of experience acquired in this study.

This report will be of value to all persons interested in tuberculosis and especially to those who have the planning and execution of rehabilitation programs for tuberculous individuals. More complete information in this field is very much to be desired and this is a worth while addition to our knowledge in this respect.

H. C. STEWART

Public Health in Bridgeport, Conn.—*Report of a Public Health Survey by the Department of Health, Yale University School of Medicine,* 1942. 91 pp.

Undertaken under the able leadership of Professor Ira V. Hiscock, this report, in common with other studies made by the Department of Health of the Yale University School of Medicine, is replete with meaningful information concerning the health situation of the community.

The report discusses in some detail the present status, and in some instances the past history, of activities and services in the various phases of public health endeavor: vital statistics, water supply, sewage disposal, refuse collection and disposal, housing, milk control, food, sanitation, control of

communicable diseases, venereal diseases, tuberculosis, maternal and child health, school health, public health nursing, and special problems such as crippled children, hearing and vision, nutrition, mental hygiene, cancer, and heart disease. There are also brief discussions of community health education, organized care of the sick, and the Community Chest and Council of Social Agencies.

Each major section has a summary with pertinent suggestions as to what ought to be done to correct weaknesses. The dominant weakness is the lack of an adequate staff of well trained people.

The report concludes with three pages devoted to "Tentative Suggested Recommendations for a Long-Term Program."

To those interested in the development of public health over a period of years the report sounds a sad note in that it shows clearly how a health organization and program which stood in the front ranks three decades ago has retrogressed and failed to keep pace with the times until now it has reached its lowest ebb. Fortunately such examples are rare. The retrogression in organization and program is spoken of quite frankly but the underlying causes responsible for the failure are not made clear except perhaps there is a hint to the reader as the report calls attention to the weakness of the community health education program.

The report is well worth reading. It would have been easier reading, and just as effective, with fewer statistics. The detailed statistical information might well have been placed in an appendix.

As an experience for students of public health the survey was doubtless of very real value. The written report also constitutes a useful document for teaching. If the report is designed to bestir the people of Bridgeport to effective action it leaves much to be desired. It lacks forcefulness and proper emphasis. All the suggestions for needed improvements are included, but they do not stand out in bold relief and all too frequently they are offered as suggestions rather than as clear-cut, definite, forceful recommendations.

CARL E. BUCK

Mental Health in College—*By Clements C. Fry, M.D., with the collaboration of Edna G. Roston. New York: Commonwealth Fund,* 1942. 382 pp. Price, $2.00.

In this analysis of the records of Yale students with emotional difficulties, the authors present interesting case histories illustrating the various factors entering into the development of emotional problems over a 10 year period. They also explain clearly, and at length, their significance to educators and to those responsible for the early training of students.

Dr. Fry demonstrates and explains how important are such factors as the family, ignorance of sex changes in a maturing youth, scholastic deficiencies, and the social strivings and disappointments of young people, even in a university environment as nearly perfect as that of Yale. Studies are also presented of the special problems developing among students during each of the 4 years of undergraduate work, and of those arising in the graduate schools. The psychiatric cases, though relatively few, are also analyzed.

In order that he may understand the environments in which these difficulties develop, the reader is told a good deal about life at Yale.

Reports on the analyses of case records are often dry and difficult to read. Not so, this book. Though it is long, requires careful reading, and even study, it is well written and contains valuable material.

Those living and working with col-

lege students will find in this book a most sympathetic understanding of their problem cases. To school administrators and to educators in general, this study will present a challenge to devote more study to this field of emotions.

GEORGE T. BLYDENBURGH

BOOKS RECEIVED

CHEMICAL TECHNICAL DICTIONARY. By A. W. Meyer. Brooklyn: Chemical Publishing Co., German-English-French-Russian, 1942. 870 pp. Price, $8.00.

LABORATORY MANUAL FOR CHEMICAL AND BACTERIAL ANALYSIS OF WATER AND SEWAGE. By Frank R. Theroux, Edward F. Eldridge and W. LeRoy Mallman. 3rd ed. New York: McGraw-Hill, 1943. 274 pp. Price, $3.00.

TEXT-BOOK OF MEAT HYGIENE. By Richard Edelman. 8th rev. ed. By John R. Mohler and Adolph Eichhorn. Philadelphia: Lea & Febiger, 1943. 468 pp. Price, $5.50.

SANITARY PRODUCTS. THEIR MANUFACTURE, TESTING AND USE. By Leonard Schwarcz. New York: MacNair-Dorland, 1943. 291 pp. Price, $5.00.

PLUMBING PRACTICE AND DESIGN. Vol. II. By Svend Plum. New York: Wiley, 1943. 329 pp. Price, $4.50.

MIND, MEDICINE AND MAN. By Gregory Zilboorg. New York: Harcourt, Brace, 1943. 344 pp. Price, $3.50.

THE MARCH OF MEDICINE. The New York Academy of Medicine Lectures to the Laity, 1942. New York: Columbia University, 1943. 217 pp. Price, $2.50.

MEDICO-LEGAL BLOOD GROUP DETERMINATION, THEORY, TECHNIQUE AND PRACTICE. By David Harley. New York: Grune & Stratton, Distributors, 1943. 119 pp. Price, $3.50.

HEART DISEASE IS CURABLE. By Peter J. Steincrohn. New York: Doubleday-Doran, 1943. 193 pp. Price, $1.98.

TUBERCULOSIS AS IT COMES AND GOES. By Edward W. Hayes. Monrovia, Cal., Author, 1943. 187 pp. Price, $2.00.

A GUIDE TO PRACTICAL NUTRITION. A Series of Articles on Nutrition, Sponsored by the Committee on Nutrition and Deficiency Diseases of the Philadelphia County Medical Society, Philadelphia, Pa. Reprinted from Philadelphia Medicine, 1941–1942. 98 pp.

OUR CHILDREN FACE WAR. By Anna W. M. Wolf. New York: Houghton Mifflin, 1942. 214 pp. Price, $2.00.

CHILDREN CAN HELP THEMSELVES. By Marion Olive Lerrigo. New York: Macmillan, 1943. 219 pp. Price, $2.25.

HOLT'S CARE AND FEEDING OF CHILDREN. By L. Emmett Holt. Revised and Enlarged. 16th ed. New York: Appleton-Century, 1943. 321 pp. Price, $2.00.

YOUR CHILD, HIS FAMILY AND FRIENDS. By Frances Bruce Strain. New York: Appleton-Century, 1943. 210 pp. Price, $2.00.

COMMUNICABLE DISEASES FOR NURSES. By A. G. Bower and E. B. Pilant. 5th ed. Philadelphia: Saunders, 1943. 592 pp. Price, $3.00.

DO YOU WANT TO BE A NURSE? By Dorothy Sutherland. New York: Doubleday-Doran, 1942. 186 pp. Price, $2.00.

PUBLIC WORKS ENGINEERS' YEARBOOK, 1943. Chicago: American Public Works Association, 1943. 313 pp. Price, $3.75.

TRANSACTIONS OF THE NINTH INSTITUTE ON PUBLIC HEALTH EDUCATION. American Public Health Association. 56 pp. Price, $1.00.

CHILDREN'S CENTERS. A Guide for Those Who Care for and About Young Children. Issued by National Commission for Young Children. Edited by Rose H. Alschuler. New York: William Morrow, 1942. 168 pp. Price, $1.50.

DIAGNOSIS OF UTERINE CANCER BY THE VAGINAL SMEAR. By George N. Papanicolaou and Herbert F. Traut. New York: Commonwealth, 1943. 47 pp., with 11 full page colored plates. Price, $5.00.

WHOOPING COUGH. By Joseph H. Lapin. Springfield: Thomas, 1943. 238 pp. Price, $4.50.

PROCEEDINGS OF NATIONAL WAR FITNESS CONFERENCE, 1943, CINCINNATI, OHIO, April 13–16. Washington, D. C.: American Association for Health, Physical Education, and Recreation. 160 pp. Price, $1.00.

ROAD TO SAFETY SERIES—Enlarged and Revised. Buckley-White-Adams, Silvernale.

A. Away We Go	.28
B. Happy Times	.80
C. In Storm and Sunshines	.84
D. In Town and Country	.88
E. Here and There	.92
F. Around the Year	.96
G. On Land and Water	1.00
H. Who Travels There	1.04
Safety in War Times	.04

New York: American Book Co., 1943.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

When Johnnie Comes Marching Home—Every man and woman among us should heed this editorial which concludes that although the value of diphtheria prophylaxis is proved beyond doubt, experience in England and Australia with the *gravis* form should convince us that the present state of knowledge concerning the control of diphtheria is not conducive to a state of complacency—a state in which most of us find ourselves, I suspect.

ANON. Grave Diphtheria. J.A.M.A. 122, 3:176 (May 15), 1943.

"Eat These Foods Every Day"—Nutritionists occasionally leave the impression that adequate diets are dependent upon a rigid food pattern. In the army they have found it necessary, and possible, to make a variety of substitutions for the "must" foods.

BERRYMAN, G. H., and HOWE, P. E. Some Nutritional Principles of Mass Feeding. J.A.M.A. 122, 4:212 (May 22), 1943.

Reminder That Vaccinia Works Faster—Antibodies against vaccinia begin to appear at the end of the first week following cutaneous vaccination, and reach a maximum at the close of the 3rd week; in variola the same antibody response occurred 26 to 30 days after infection.

BLATTNER, R. J. Antibody-Response to Cutaneous Inoculation with Vaccinial Virus in Human Subjects, Utilizing the Egg-Protection Technic. J. Immunol. 46, 4:207 (Apr.), 1943.

Toward Intelligent Eating—Food habits, food advertising, food processing, food waste, and a few other factors that interfere with good nutrition are subjected to telling scrutiny.

CARLSON, A. J. Some Obstacles in the Path Towards an Optimum Diet. Science. 97, 2522:385 (Apr. 30), 1943.

Whooping Cough — Killer of Babies — Though whooping cough mortality rates have declined markedly in recent years, it is not likely that prophylactic vaccinations have been widely enough employed to have exerted any great influence upon this decline, and should the mortality rates continue to go down it will be extremely difficult to assess the relative influence of the future extension of this preventive measure.

DAUER, C. C. Reported Whooping Cough Morbidity and Mortality in the United States. Pub. Health Rep. 58, 17:661 (Apr. 23), 1943.

Hodge-Podge Health Education—Among other examples, transcripts of nursing visits record the advice of one nurse to Mrs. A. to nurse the baby on alternate breasts, and of another nurse to Mrs. B. to nurse the baby on both breasts at each feeding. What will Mrs. A. and Mrs. B. think if they compare notes? And who would blame them for their opinions?

DERRYBERRY, M., and BROCKETT, G. S. Preserving Confidence in Health Education. Pub. Health Nurs. 35, 5:244 (May), 1943.

More TB Case Finding—Records of drafted boys deferred because of chest x-ray findings and reported to the state department of health are turned over to local officials for follow-up. Of 3,112 so deferred only 417 had been previously reported. Completed histories of 1,540 not earlier reported, indicated that 78 per cent were affected with TB in some form.

EAKINS, W. T. Tuberculosis in War Time in New Jersey. Pub. Health News. 26, 8:225 (Apr.), 1943.

War-Work and TB—Chest examinations of more than 15,000 industrial employees revealed 0.61 per cent with evidence of clinically significant pulmonary tuberculosis: apparently arrested 2.92 per cent. Increased tempo of industrial production with all its social and economic overtones calls for tuberculosis control programs throughout all industries.

EDWARDS, H. R. Tuberculosis in Industry. Am. J. Med. Sci. 205, 4:571 (Apr.), 1943.

Rats and Typhus—Rat-flea transmitted typhus cases are reported in southern United States in ever increasing numbers. Rat proofing of buildings and destruction of garbage would do away with excess rat populations and stop the spread of this needlessly endemic disease. A unit of the U. S. Public Health Service is coöperating with state authorities to this end.

ESKEY, C. R. Murine Typhus Fever Control. Pub. Health Rep. 58, 16:631 (Apr. 16), 1943.

Mechanism of Protection—Vaccination with influenza virus not only stimulates production of circulating antibodies but increases the capacity of nasal secretions to neutralize virus. If you want to know some of the implications of this finding you must search out this stimulating paper in the magazine noted below.

FRANCIS, T., JR., *et al.* The Effect of Subcutaneous Vaccination with Influenza Virus upon the Virus-Inactivating Capacity of Nasal Secretions. Am. J. Hyg. 37, 3:294 (May), 1943.

After the Uncoöperative Patient Departs—Half the tuberculous patients who left three city sanatoria against advice in 1935 were found, 7 years later, to have died. Another third had relapsed but were still hanging on. This is a public health problem of the first magnitude, wisely concludes the writer.

GUEST, K. R. Follow-up of the Known Tuberculous Patient. Am. Rev. Tuberc. 47, 3:325 (Mar.), 1943.

Liver for Blood Donors—Of interest to all blood donors—as who of us under 60 isn't—is this discussion which concludes that good nutrition favors rapid blood regeneration. Among the proteins rich in iron, liver, kidney, and oysters seem to be featured.

MCKIBBIN, J. M., and STARE, F. J. Nutrition in Blood Regeneration (and) TURNER, D. F. Dietary Recommendations for Blood Donors. J. Am. Diet. Assoc. 19, 5:331 (May), 1943.

TB in the Publicly Assisted—Among 5,000 unemployed adults examined and reëxamined for tuberculosis, only one of the originally negative cases was later found tuberculous, and among the healed cases only one was found to be reactivated 12 months later. Annual reëxaminations of these people would seem not to be economically justified.

MILLER, R. E., and HENDERSON, B. The Epidemiology of Tuberculosis in a Low Income Group. Am. Rev. Tuberc. 47, 3:334 (Mar.), 1943.

Remember This One Next Winter—Oral administration of heat-killed "cold" vaccines had no influence on the incidence or severity of common colds when tried upon volunteers from the Visiting Nurse Service of New York City.

SIEGEL, M., *et al.* A Study of the Value of a Mixed Bacterial "Oral Cold Vaccine." Am. J. Med. Sci. 205, 5:687 (May), 1943.

Syphilis Discovery Rates—Substantial reductions in congenital syphilis are reported from Baltimore. Despite better case finding facilities, no new cases were unearthed among white children under 5, and only 12

cases among Negroes during the last 3 years. Among white adults a significant decline in annual discovery rates occurred, but there was no convincing evidence of the same trend among the colored.

TURNER, T. B., *et al.* Studies on Syphilis in the Eastern Health District of Baltimore City. Am. J. Hyg. 37, 3:273 (May), 1943.

"Medical Treatment for Every Briton in Whatever Form He Requires It"—According to the Beveridge report no satisfactory social security scheme can be devised except on the following assumptions: (a) school children's allowances; (b) health and rehabilitation services for everyone; (c) maintenance of employment. What assumption (b) means in terms of British health and medical services is discussed in detail.

UNDERWOOD, E. A. The Beveridge Report and the Health Services. Pub. Health. 56, 8:89 (May), 1943.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND SEVENTY-SECOND ANNUAL BUSINESS MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

RATES QUOTED BY NEW YORK HOTELS

Wartime Public Health Conference and Seventy-second Annual Business Meeting—October 12–14, 1943

	Rooms With Bath	
	Single	*Double*
Headquarters:		
Hotel Pennsylvania, 7th Avenue and 33rd Street	$3.85– 8.80	$5.50– 9.90
Hotels near Hotel Pennsylvania:		
Governor Clinton, 31st Street and 7th Avenue	3.30– 5.50	4.40– 7.70
McAlpin, Broadway and 34th Street	3.30– 6.60	4.95– 8.80
New Yorker, 34th Street and 8th Avenue	3.85– 8.80	5.50–11.00
Selected Hotels Outside Pennsylvania Zone:		
Ambassador, Park Avenue and 51st Street	5.00– 8.00	7.00–10.00
Astor, Broadway and 44th Street	3.00– 5.00	5.00– 8.00
Barbizon (Women), Lexington Avenue and 63rd Street	3.00– 3.50	4.50– 5.50
Biltmore, Madison Avenue and 43rd Street	5.50–12.00	7.50–14.00
Bristol, 129 West 48th Street	2.50– 4.00	3.50– 6.00
Commodore, Lexington Avenue and 42nd Street	3.50– 5.50	5.50– 8.80
Cornish Arms, 311 West 23rd Street	2.25– 2.50	3.50– 4.00
Fifth Avenue Hotel, 24 Fifth Avenue (9th Street)	3.75– 5.00	5.00– 7.00
George Washington, 23rd Street and Lexington Avenue	2.00– 4.00	3.50– 6.00
Lexington, 48th Street and Lexington Avenue	4.00– 6.00	5.50– 8.00
Lincoln, 8th Avenue and 44th Street	3.00– 5.00	4.00– 8.00
Midston House, 22 East 38th Street	3.00– 3.25	4.00– 4.50
New Weston, Madison Avenue and 50th Street	4.00– 6.00	6.00– 9.00
Paramount, 46th Street, West of Broadway	2.50– 4.50	4.00– 8.00
Park Central, 7th Avenue and 55th Street	4.00– 5.00	6.00– 7.00
Parkside, 18 Gramercy Park South	2.50– 3.00	5.00
Piccadilly, 227 West 45th Street	2.50– 4.00	3.50– 6.00
Prince George, 14 East 28th Street	2.50– 4.00	3.50– 7.00
Roosevelt, Madison Avenue and 45th Street	4.50– 8.00	6.50–12.00
St. Regis, Fifth Avenue and 55th Street	6.00– 7.00	7.00–11.00
Seymour, 50 West 45th Street	4.00– 5.00	5.50– 6.00
Shelton, 49th Street and Lexington Avenue	3.50– 5.00	5.00– 7.00
Waldorf-Astoria, 50th Street and Park Avenue	7.00–10.00	10.00–15.00
Wellington, 7th Avenue and 55th Street	2.50– 4.00	3.50– 6.00

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Edward P. Cutter, M.D., Box 209, DeFuniak Springs, Fla., Walton-Okaloosa County Health Officer

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Unaffiliated

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Vernon B. Link, M.D., 15 Pine St., U. S. Public Health Service, New York, N. Y., Passed Asst. Surgeon

Evelyn A. Watson, R.F.D. 1, St. Albans, W. Va., Nurse

DECEASED MEMBERS

Harry Goldman, M.D., M.P.H., Boston, Mass., Elected Member 1943, Epidemiology Section

Martin H. Knutsen, M.S., State College, Pa., Elected Member 1919, Unaffiliated

CHANGES IN THE APPRAISAL FORM FOR COMMUNITY HEALTH WORK

Dr. Henry F. Vaughan, Chairman of the Committee on Administrative Practice, has announced recent decisions of the Committee on Administrative Practice with respect to the appraisal of local health work which will be of interest to health officers over the country.

Up until recently there have been two distinct forms, one the ***Appraisal Form for Local Health Work*** (1938 edition), and the other the ***Evaluation Schedule,*** used in connection with the National Health Honor Roll, and, prior to that, in the Interchamber Health Conservation Contest. As these two forms called for different types of information and were set up on different principles, there has been confusion over their uses. In order to avoid this confusion, the Committee on Administrative Practice has decided to limit appraisal practices to one form.

The ***Evaluation Schedule*** has been selected as the surviving form. The ***Appraisal Form for Local Health Work*** has, therefore, been discontinued and

will not be revised or reprinted. The few remaining copies on hand will be sent out to those who request them.

The *Evaluation Schedule* will be revised to some extent and reissued this fall. It will be recognized hereafter as the official form for appraisal purposes. It will be used both in connection with the National Health Honor Roll and for other purposes as may be needed.

The Committee on Administrative Practice has also approved the preparation of a ***Guide to the Evaluation Schedule*** which it is expected will be published in the fall. One further decision was to approve the issuance of a booklet to be known as "Health Practice Indices." This will consist of a series of charts showing the range of units of practice for cities and counties which have submitted schedules for the years 1941 and 1942. It is believed that this pamphlet will serve a most useful reference purpose to health officers as it will depict practices over the country as represented by those communities which have participated in the National Health Honor Roll in the last two years.

The preliminary revision of the ***Evaluation Schedule,*** the preparation of the ***Guide,*** and the compilation of the ***Health Practice Indices*** are now under way in the hands of the subcommittee on Manual and Appraisal of Local Health Work.

The material will be submitted for approval at a projected meeting of the subcommittee in the late summer, and it is hoped that all material will be available in published form before the end of the year.

CLOSING DATE FOR SUBMITTING FELLOWSHIP APPLICATIONS

Members who may be interested in applying for Fellowship in the A.P.H.A. are hereby advised that Fellowship applications should be received by the Central Office not later than August 1, to insure consideration at the Wartime Public Health Conference and 72nd Annual Business Meeting to be held in New York October 12 to 14.

WORKSHOP ON ADJUSTMENTS DURING WARTIME OF SCHOOL HEALTH PERSONNEL

The most pressing school health problem today is the adjustment of personnel to meet the war emergency. The School Health Section, in coöperation with the Food and Nutrition Section and the American School Health Association, will conduct a Workshop on this subject in connection with the Wartime Conference in New York City, October 12–14. The Workshop will be divided into three groups for discussion of problems in (a) rural areas, (b) medium size communities, and (c) large cities.

Registration for these working sessions is limited to 30 for each of the three groups. Complete details may be obtained from Dr. George M. Wheatley, Secretary, School Health Section, 1 Madison Avenue, New York, N. Y.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from $3,200 to $4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Merit System for Personnel Administration, Delaware, is accepting applications for position of Deputy State Health Officer in Delaware State Board of Health. Salary range $3,600 to $4,200. Applications accepted until further notice. Those interested should communicate with Merit System Supervisor, P. O. Box 1911, Wilmington, Delaware, or State Board of Health, Dover, Del.

Sanitarian wanted: Starting salary $1,800 per year with travel allowance of $50 per month: Man must have own car. Bachelor's degree followed by at least one year's course or its equivalent in subjects necessary for one entering the public health field, or an engineering degree plus one year's experience in sanitary or public health engineering required. A course in public health training may be considered as an equivalent for a part of the experience requirement. Apply Dist. Dept. of Health No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Wanted: Two physicians, immediate appointment, full-time venereal disease clinician, conduct several small clinics rotating schedule. Experience preferred. Salary $3,600 plus actual expense not to exceed $1,200. Write State Health Department, Santa Fe, New Mexico.

The Board of Health, Territory of Hawaii, announces applications will be received for positions as Medical Technician in their public health laboratories. The positions: Civil Service Classifications, SP-5, salary range $154.17 to $192.92 per month; SP-6, $172.50 to

$217.50 per month, subject to retirement deductions under Hawaiian Civil Service System, plus graded bonus for the period of time such bonus remains in effect for Territorial Government employees.

Interested persons may make written application to Board of Health, Territory of Hawaii, P. O. Box 3378, Honolulu, T. H.

Notice of an expected vacancy for an Industrial Hygiene Engineer in the Los Angeles County Health Department has been received. Those interested should communicate with Dr. H. O. Swartout, Acting County Health Officer, Los Angeles, Calif.

Announcement is made of the following examinations to be held by the State Personnel Board, Seattle, Wash., for positions in the State Department of Health and County Health Departments:

Position	*Salary Range* *Entrance*	*Maximum*
Bacteriologist	$135	$160
Laboratory Assistant	125	145
District Public Health Officer, II	325	425
Public Health Nurse	145	170
Asst. Venereal Disease Investigator	150	190
General Sanitarian	160	200
Milk Sanitarian	160	200
Chief of Public Health Education	275	335
Senior Milk Sanitarian	190	230
Obstetric Consultant	375	450
Pediatric Consultant	375	450
Senior Bacteriologist	160	200
Assistant Sanitarian (Open to Men and Women)	125	150

Assistant Vital Statistician wanted by outstanding private health agency, New York City. Salary $3,000 per annum. Apply stating education, special training and practical experience. **Box N**, Employment Service, A.P.H.A.

Wanted: Laboratory technician, tuberculosis hospital, 130–150 beds. Salary $175 per month and full maintenance. Opportunity to do research. Nice surroundings, good living quarters. Write Dr. Paul D. Crimm, Boehne Hospital, Evansville, Ind.

THE MERIT SYSTEM COUNCIL OF WEST VIRGINIA ANNOUNCES UNASSEMBLED EXAMINATIONS FOR THE FOLLOWING POSITIONS IN THE WEST VIRGINIA STATE HEALTH DEPARTMENT

Position	*Salary*
Director of Maternal and Child Hygiene	$4,200–$4,800
Assistant Director, Maternal and Child Hygiene	3,840– 4,500
Director, Industrial Hygiene	4,200– 4,800
Director, Vital Statistics	4,200– 4,800
Director, Communicable Diseases	4,200– 4,800
Assistant Director of Communicable Diseases (Tuberculosis)	3,840– 4,500
Assistant Director of Communicable Diseases (Venereal Disease)	3,840– 4,500
Venereal Disease Consultant	3,840– 4,500
Director, Bureau of Dental Hygiene	3,840– 4,500
Director of County Health Work	4,200– 4,800
Senior Health Officer	3,840– 4,500
Junior Health Officer	3,360– 3,840
Health Officer Trainee	2,400
Assistant Director, Hygienic Laboratory	2,640– 3,240
Senior Bacteriologist	1,800– 2,400
Senior Serologist	1,800– 2,400
Consultant Nurse in Special Fields	2,400– 3,000
Public Health Nursing Supervisor (State level)	1,920– 2,400
Public Health Nursing Supervisor (Local level)	1,800– 2,040
Chief of Medical Services	4,800– 5,280

Persons interested should make application to the Merit System Council, 212 Atlas Building, Charleston, W. Va.

Residence in West Virginia has been waived. Applications will be accepted continuously.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, 19, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

Physician, age 36, M.D. Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. A-476

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. A-505

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as city or county health officer or director of a bureau. A-506

M.D., Dr.P.H., now a practising physician, chief of a clinic, diplomate in his specialty, professor in a medical school, ineligible for military service but in good health, wishes to make a change in his work and be employed in war industry. A-504

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and bacteriologist and serologist in syphilis and enteric diseases. L-465

Advertisement

Opportunities

PUBLIC HEALTH PHYSICIANS—(a) Director; maternal, child and school hygiene department; pediatric training desirable; public health experience unnecessary; salary commensurate with qualifications. (b) Young woman physician for student health appointment; immediately; East. (c) Field position; state department of health; should be effective public speaker; will provide health training if not trained; Midwest. (d) Staff appointment, department of venereal disease control; special training unnecessary; vicinity Washington, D. C. (e) Director of district health department; training or experience in public health, preferably in administrative side, desirable; $4,500, plus traveling allowance. (f) Chairman of health division, mid-western college averaging 1,500 students; excellent department splendidly staffed; well equipped infirmary; duties include health education; should be sufficiently trained in psychiatry to be able to help normal young people with problems; must be capable administrator. (g) Assistant director, school of health; public schools; midwestern metropolis. (h) Student health appointment; approximately 1,600 students; Southwest. PH6-1, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

PUBLIC HEALTH NURSES—(a) Health educator; previous experience in teaching or counseling desired; salary open; Alaska. (b) Public health nurse, to assist in health program for employees of large organization; minimum salary, $155; with periodic bonuses; Midwest. (c) Public health supervisor for large city health department; must meet requirements of N.O.P.H.N. for educational supervisor; will be in charge of teaching center for induction of new staff nurses, and field supervisor of twenty nurses; $2,500, with annual increases for merit; large midwestern industrial city. (d) Resident nurse; public health nursing certificate required; will organize health program for school and care for boarding students; outstanding girls' school, large midwestern city; salary open. (e) Instructor in school health education; will be assigned to work in New York metropolitan area; $1,800, with increase to $2,000 after probationary period. PH6-2, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

Situations Wanted

PUBLIC HEALTH ADMINISTRATOR — is available; academic and medical degrees, southern schools; 6 years director department of mental hygiene; 9 years, public health officer; for the past 3 years has successfully filled important administrative appointment. For further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—is available for executive position; B.S. degree Columbia; 3 years, supervising nurse, state department of health; 5 years, field supervisor, large industrial company; 4 years, educational director, public health department, college of nursing. For further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago.

NEWS FROM THE FIELD

SERVICES FOR THE CHILDREN OF WORKING MOTHERS

Further extension of the assistance offered states and localities in the development of services for the children of working mothers has been announced by Charles P. Taft, Director of Community War Services, Federal Security Agency.

Thirty-three state departments of education and 28 state departments of welfare in 38 states, the District of Columbia, and Hawaii have received grants from an allocation from the President's Emergency Fund administered by Mr. Taft's office. The states have been notified that personnel may continue to be paid from this fund through the current fiscal year.

Grants are made by the Federal Security Agency on the basis of state plans approved and recommended by the Children's Bureau of the U. S. Department of Labor or the U. S. Office of Education.

Field representatives of the Office of Education and the Children's Bureau work with state departments of education and welfare in organizing and planning state programs, and make recommendations to the Federal Security Agency's Office of Community War Services for grants to help carry out these plans.

Personnel employed through these grants are engaged in a variety of activities to help set up a wartime child care program. Many of them are coördinators of state or local programs working with Child Care Committees of the Defense Councils to expand, extend, and integrate services of the public and private agencies in the state or locality. Others, specialists in the fields of child welfare, nursery school education, and extended school programs, have given local welfare and education authorities technical guidance in the development, administration, and supervision of specific types of services for the children of working mothers.

AMERICAN-SOVIET MEDICAL SOCIETY FOUNDED

To meet an increasing demand for information about the results and achievements of Soviet medicine, the formation of the American-Soviet Medical Society is announced.

The society will keep physicians of America and members of the allied professions informed through meetings, the publication of a journal, and the establishment of a library of information. American medical books and periodicals will be sent to the Soviet Union to advise the Russians of scientific developments in this country and to stimulate closer coöperation between the medical corps of the two countries. After the war, as soon as conditions permit, the society hopes to promote the exchange of students and scientists and to sponsor study tours in the two countries.

The president of the society is Dr. Walter B. Cannon, Professor Emeritus of Physiology at Harvard University, member of the National Academy of Sciences of the United States and of the Academy of Sciences of the U.S.S.R.

Dr. Henry E. Sigerist, Director of the Institute of the History of Medicine, Johns Hopkins University, is the editor of the journal which will be known as the "American Review of Soviet Medicine."

The temporary offices of the society are at 130 West 46th Street, New York, N. Y.

FEDERAL EMPLOYEE HEALTH PROGRAM

"The Health Program of the United States Bureau of the Census," by Leon Schwartz, M.D., Medical Officer, is a report on a health program for the employees of the Bureau of the Census working in the new office building at Suitland, Md. Dr. Schwartz is responsible for the organization and conduct of the program which embraces preventive, diagnostic, and therapeutic services. A good deal of progress can be recorded since he took charge on September 1, 1942, and there are ambitious plans ahead. Medical forms and records are reproduced in the report, and an organization chart and a floor plan of the medical unit. Copies of the report may be obtained from Dr. Schwartz.

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

The Northern California Public Health Association announces that the following new officers were elected at the recent Annual Meeting of this society:

President—William A. Powell, M.D., Martinez
President-elect—Dwight M. Bissell, M.D., San Jose
Vice-President—Walter S. Mangold, Berkeley
Treasurer—Helen S. Hartley, R.N., Stockton
Secretary—Ann W. Haynes, San Francisco
Representative on A.P.H.A. Governing Council—John D. Fuller, M.D., Santa Cruz
Representative on Regional Board of A.P.H.A. Western Branch—Malcolm H. Merrill, M.D., Berkeley

A CALIFORNIA SCHOOL OF PUBLIC HEALTH

Governor Earl D. Warren of California has signed a bill, previously passed unanimously by the Legislature, authorizing the Board of Regents of the University of California to establish a school of public health for the graduate training of all classes of public health personnel and appropriating modest funds therefor. It is stipulated that the funds must be used during the current biennium. It is planned to use existing facilities on all campuses of the University of California which may be useful in this training. Last year Dr. Walter H. Brown, formerly Professor of Hygiene at Stanford University, was released to the University of California at Berkeley to assume chairmanship of the Department of Hygiene and to prepare the way for a school of public health.

FLORIDA PUBLIC HEALTH ASSOCIATION

New Officers of the Florida Public Health Association for the current year are as follows:

President—Leland H. Dame, M.D., Sanford
1st Vice-President—J. B. Miller, Jacksonville
2nd Vice-President—W. W. Rogers, M.D., Jacksonville
Secretary-Treasurer—Edward M. L'Engle, M.D., Jacksonville

DR. ELVEHJEM RECEIVES WILLARD GIBBS MEDAL

The Willard Gibbs Medal, ranking honor in American chemistry, has been presented by the Chicago Section of the American Chemical Society to Conrad A. Elvehjem, Ph.D., Professor of Biochemistry at the University of Wisconsin. The award recognized Dr. Elvehjem's work in the study of "trace elements" in nutrition and on tissue respiration as applied to the study of vitamin function.

NURSING IN WAR MANPOWER COMMISSION

Alma C. Haupt, R.N., has been designated Chief of the Nursing Supply and Distribution Unit established in the Placement Bureau of the War Manpower Commission recently. The new unit is designed to effect an equitable distribution of graduate nurses for military, governmental, and essential civilian needs. State and local Councils for War Service will be utilized for the

operation of the unit. Quotas will be set up on national and state bases for the guidance of nurses in accepting service in military, governmental, and essential civilian activities. Katherine Tucker, R.N., Director of the Department of Nursing Education, University of Pennsylvania, has been appointed Chairman of an Advisory Committee to the Nursing Supply and Distribution Unit.

CHRONIC ILLNESS IN NEW YORK CITY

The Welfare Council of New York City offers to readers of the JOURNAL a limited number of copies of *Chronic Illness in New York City*, by Mary C. Jarrett, a study in two volumes made by the Council's Research Bureau. The only charge is for wrapping and mailing, amounting to about 20¢. Requests for copies should be addressed to: Edgar J. Sherman, Director of Finance, Welfare Council of New York City, 44 East 23rd Street, New York, N. Y.

HANDBOOK ON RHEUMATIC FEVER

"Rheumatic Fever in Children—Its Recognition and Management" is a brief clinical handbook written for the practising physician which, perhaps for the first time, makes available under one cover the modern concept of the disease in its various aspects. It describes in concise and authoritative style, the early diagnosis and treatment of rheumatic fever and the methods of managing the disease and recognizing its cardiac involvements. This handbook has been developed by the Metropolitan Life Insurance Company as a part of the insurance company's current educational drive against rheumatic fever. It was prepared in consultation with a group of distinguished clinicians and the following organizations: The American Heart Association, The American Academy of Pediatrics, The Children's Bureau of the U. S. Department of Labor, The U. S. Public Health Service.

Single copies of the handbook are being made available to physicians chiefly through the Metropolitan's 16,000 field representatives. Physicians who have not secured a copy may write to Dr. George M. Wheatley, Assistant Medical Director, Metropolitan Life Insurance Company, 1 Madison Avenue, New York, N. Y.

PROPOSED BUREAU OF VITAL RECORDS

The principal provisions of Senate Bill 1096—"To Establish a Bureau of Vital Records in the U. S. Public Health Service and for other Purposes"—

The Bill provides:

For the transfer of the vital statistics activities of the Bureau of the Census to the U. S. Public Health Service. The head of the proposed new bureau is to be an assistant surgeon general, and his duties will be to promote improvement of registration of vital statistics procedures in the states, and to coördinate practices with regard to the records of births, deaths, marriages, and divorces. It is proposed that the records and personnel of the Bureau of Vital Statistics be transferred from the Bureau of the Census to the U. S. Public Health Service.

For the purpose of assisting states and their political subdivisions in establishing and maintaining adequate vital services, including training of personnel, it is proposed that there be appropriated the sum not to exceed $2,000,000 for a year. This sum is to be allocated in much the same way as Title VI Social Security Funds are at present distributed.

MATERNITY CARE

As of May 20, with plans of other states expected to be acted on in a few days, twenty-three state health agencies were authorized to provide maternity care for wives of men in the four lowest

pay grades of the armed forces, and medical hospital and nursing care for their babies, both without cost to the family, according to the Children's Bureau.

States whose programs have been submitted and approved are: Arizona, Arkansas, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maine, Maryland, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oklahoma, Rhode Island, South Carolina, Utah, Vermont, West Virginia, Wisconsin, and Wyoming.

Under approved states plans, wives of these service men may receive complete medical care during pregnancy, childbirth, and 6 weeks after. At childbirth, whether the wife stays at home or goes to a hospital, she and her baby may have medical and nursing care. Medical care is also provided for the baby throughout his first year of life. All that the wife needs to do to apply is to fill out a simple form which she can get from the state health department.

FIELD TRAINING IN HEALTH EDUCATION AT THE CLEVELAND HEALTH MUSEUM

During the month of August, 27 students in health education from the University of North Carolina will work as Museum interns to receive a course of instruction, do laboratory work, and gain field experience in the methods of health education, especially in health exhibits. Among those students are the 17 individuals who were awarded fellowships by the U. S. Public Health Service, from a grant made available by the W. K. Kellogg Foundation.

The 4 week course at Cleveland Health Museum is part of 3 months' academic training in order to obtain a degree of Master of Science in Public Health. The course will be conducted by Bruno Gebhard, M.D., Director of the Cleveland Health Museum and Associate in Health Education, Western Reserve University School of Medicine.

Besides instruction in the principles and methods of visual health education the students will gain practical experience in three work units; on ideas, facts, figures, and manuscripts; on designing, constructing, and budgeting of exhibits; and on placement, publicity, visitors' reaction, and follow up.

The Museum's facilities including the workshops, the loan service, traveling exhibits, the film library, and the Museum's own exhibits will be used for this training.

SOME SENATORS DO ANSWER THEIR MAIL!

Among the constituents of all 96 United States Senators, there are many public health workers, we have reason to know, who have been perturbed by the implications of Senate Bill 575. This is the bill introduced by Senator McKellar which would make appointments to all positions in the Executive Branch of the Government carrying a salary of more than $4,500 a year subject to the approval of the Senate. Its status on May 26, as this is written, is that it is on the calendar.

The Association asked all Senators this question by telegraph on May 11:

> What shall I reply to a promising young public health man who believes that passage of Senate Bill 575 will deprive him of all career opportunity in public service as a policy making officer? The American Public Health Association reflects opinion of public health profession that this bill will seriously undermine growing confidence in the Civil Service.

Senators O'Daniel (Texas), Hawkes (New Jersey), and Mead (New York) replied by wire the same day. Each will "give measure consideration." Senator Hawkes added "regards" and the information that he has been studying the bill carefully.

Senator Truman (Missouri) personally acknowledged the wire the day it was received. He "will be glad to

give these views consideration in the event that the bill should come up for vote."

So did Senator McKellar (Tennessee). His twenty word letter said merely that he introduced the bill only after the most careful thought and consideration.

Senator Van Nuys (Indiana) answered via Clerk J. F. Mattice on May 12. He suggested the following reply to the promising young man:

> That the bill is not intended to deprive him of all career opportunity in public service and will not operate to do such thing; that the same opportunity will exist as does in the Army and Navy and Coast Guard services, all of whose officers are and for a long time have been confirmed by the Senate after nomination by the President. Young men set about on a Career in the Army or Navy, or in the diplomatic service, and are not deprived of all career opportunity because they are required to be appointed by the President by and with the advice and consent of the Senate. The system as to those career men works very well and no appreciable amount of time of the Senate is taken up in making confirmations. Thirdly, such method of appointment of policy making, army, navy and diplomatic representatives, is the constitutional way—in accordance with the provisions of the Constitution of the United States. The present Bill is aimed at the thousands of persons who have been "blanketed into civil service status" since Pearl Harbor and placed upon positions where they issue orders, regulations, etc., having the effect of law (though not enacted by Congress), which affect the lives and welfare of the citizens of the United States. The public holds Congress responsible for the things of that sort about which they complain, though Congress has nothing to say about their selection.

Senator Pepper (Florida), in a personal acknowledgment dated May 12 was "inclined to oppose" the bill, although he had not made a detailed study of it.

Senator Burton (Ohio) sent an undated, mimeographed reply (received on May 14) which was necessary, it was explained, because of the heavy mail on the bill. He agrees with "the need for preserving the merit system and the Civil Service." He does not believe it necessary to follow Senator McKellar's proposal. He is "oposed to the bill as it was originally introduced" but it "deserves consideration" in its new form as amended by the Committee. If, however, the new form "still weakens substantially the effectiveness of our merit system, as it apparently does," he will "continue to be opposed to it." Senator Burton added a handwritten note to his thoughtfully prepared form letter—"I believe that your young friend need not worry about his career on merit if he will continue to concentrate on the high degree of public service that is the proper basis of advancement."

Senator Capper began his letter dated May 17 with an apology for his delay in replying and continued:

> The bill does not make a special provision for health officers, who would be affected in precisely the same way as all the other better-paid executive employees of the federal government. There seems to be considerable opposition to the McKellar bill, as well as the Hatch and O'Mahoney substitutes, which would require that government officials drawing more than $4,500 be confirmed by the Senate. Current information is pretty much to the effect that there may not be any action at all at this Session. I am strong for Civil Service and the merit system. Senator McKellar's bill is now on the Senate Calendar with a favorable report from the Senate Judiciary Committee. You may be sure I will go into the subject thoroughly when it comes up in the Senate for consideration and action. I certainly do not want to do anything that will destroy the principles involved in the Civil Service Program.

And that is how the score stands for our side: nine hits, three runs, and eighty-five errors. Perhaps we should make that four hits, and one less error, because one of our spies sends us a letter from Senator Wagner (New York) who believes "the bill, in operation, would seriously impair the merit system." Yes, some Senators do answer their mail!

PRACTICAL ACTION BY STATE AND LOCAL HEALTH DEPARTMENTS TO MEET THE PERSONNEL SHORTAGE

The A.P.H.A. Committee on Professional Education at its meeting on June 11 reviewed the present personnel shortages with the background of experience of its own members, representing a wide coverage in the nation, and with the help of consultants invited for the purpose of completing the picture.

It is apparent that acute shortages are now general in the supply of public health engineers, of doctors with administrative training and experience, and of public health nurses. Other shortages are rapidly becoming more serious due to the absence of the usual recruits from the universities.

It is also apparent that these shortages have reduced essential services from health agencies of all kinds, even in those areas of acute need where more service is now required than in peace times. There can be no question but that these reductions have already an unfavorable effect on the public health. Members of the committee reported having seen sanitary sewage running in open ditches through heavily populated streets, and it is common knowledge that maternity care in some areas is small in amount and of indifferent quality. It is also common knowledge that attacks of gastroenteritis are becoming common among all travelers who must depend on the overburdened food handling facilities and there is reason to believe that the usual barriers to the spread of such infections are seriously lowered. Supervision of water and sewage treatment plants and of milk pasteurizing facilities has been notably weakened by the withdrawal of those trained and experienced in this work. The hygiene of critical industries is being neglected in some places at a time when the output of factories will determine the outcome of the war.

The attention of the committee was called to the fact that a considerable number of the states have at their disposal more funds than they are using. The real problem lies in finding competent persons who can render basic public health services, upholding standards which have been proved so necessary to the protection of life and health. In some instances it was said that the high qualifications set up in peacetime now stand in the way of bringing onto staffs persons who can render acceptable service, although they cannot meet the standards set previously for career service.

Inasmuch as the Committee on Professional Education of the American Public Health Association has for more than ten years spent its full efforts in lifting levels of professional service in health agencies, it seems appropriate for the committee to face quite realistically the situation which the emergency has brought and to take the measure of the man power shortage as it affects public health.

The committee was reminded that the Association has officially declared at the last meeting that professional qualifications should be upheld for those persons seeking permanent status but that, when the emergency demands that inadequately trained personnel be employed, such persons should be placed on temporary appointment and in special grades below those which the position would normally rate. The Association has further recommended that every effort be made to continue the professional training of all types of persons, utilizing to the fullest extent the funds which are available from all sources. There is no evident lack of funds at the present time, as indicated by the unused balances of federal appropriations which are being re-

turned at the fiscal year end, and the committee reaffirms the necessity of adapting the training program of each agency to the needs of the situation. It is the understanding of the committee that the U. S. Public Health Service and the Children's Bureau have already made provision for a special class of "war service" personnel in acceptable budgets. There is evidence that the schools of public health and other training institutions will be most coöperative. It is a perilous state indeed when those responsible for the health of some of our large population units neglect the opportunity of using available funds for the preparation of any who can help in this emergency.

The availability of women for work ordinarily done by men and of those of older years has been well established. Sanitation services and other basic protections of the public health must not be allowed to suffer at a time like this. The committee recommends that all state health officers take the steps necessary to get under training those whose services are so urgently required. Some of these persons can and should be sent now for formal academic courses of longer or shorter duration, according to the situation in each state. Some persons can and should be employed now, even if their qualifications are incomplete according to standards previously declared. There is good precedent for placing these persons in war service positions where they can contribute most, and then seeing that they have either academic or in-service training to the practical limit available.

The committee is confident that the career standards to which it is already so fully committed may be protected safely for the future only if such urgent steps as these are promptly taken by appointing officers. We believe that the initiative for such steps is a proper responsibility of state and local health officers who are facing present and prospective staff shortages. In presenting this challenge to the public health profession the committee directs its own staff to lend all possible aid and assistance to accomplish these ends.

SAN FRANCISCO OPENS SOCIAL HYGIENE WOMEN'S COURT

Dr. J. C. Geiger, Director of Public Health, announced the opening of the San Francisco City Separate Women's Court, located in the Health Center Building, San Francisco. The Separate Women's Court is established to meet the problem of the professional prostitute, streetwalker, and other sexually promiscuous women who are arrested by the Police Department.

Prior to the opening of the Separate Women's Court these women were housed in the women's section of the San Francisco City Prison. During their confinement first offenders were placed with habitues and frequently with other criminals thus affording an excellent opportunity for promoting the maladjustment of the first offender.

The objectives in the Separate Women's Court are to render an entirely individualized case study plan. Every effort is made to provide means for adequate referral of first offenders who present a potentiality of reëducation and readjustment.

The medical coördinator of the Separate Women's Court is the Chief of the Division of Venereal Diseases, Dr. Richard A. Koch. The personnel of the Separate Women's Court consists of a judge, a medical coördinator, a deputy district attorney, a woman physician, a registered nurse, three social workers, four police matrons, one court reporter, one court clerk, a bailiff, and two general clerk stenographers.

WAR MANPOWER COMMISSION CREATES UNIT ON NURSING SUPPLY

Paul V. McNutt, the Chairman of the War Manpower Commission, has an-

nounced the creation of a division on nursing supply and distribution similar to the Procurement and Assignment Service for medical and engineering personnel. Alma Haupt, R.N., of Washington, has been appointed chief of the unit, with Miss Louise Baker of San Francisco as associate chief. Katherine Tucker, R.N., of Philadelphia has been appointed Chairman of the Unit's Advisory Committee. Liaison members of the Unit include the National Nursing Council for War Services, American Red Cross, the Army, Navy, Veterans Administration, and Public Health Service, the Children's Bureau, the Office of Indian Affairs, the Office of Civilian Defense and the Civil Service Commission.

"YOUR HEALTH" RADIO PROGRAM

Carl A. Wilsbach, M.D., Commissioner of Health of Cincinnati, began a new series of weekly radio broadcasts over Station WLW on June 19. The program is entitled "Your Health," is broadcast at 9:45 A.M., E.W.T., on Saturdays, and is sponsored by the Academy of Medicine, the Public Health Federation and the Cincinnati Board of Health. It utilizes Dr. Wilzbach as narrator, interspersed with dramatic sequences.

Central States

CLYDE D. BLAKE, M.D., of Hays, Kans., Past President of the Kansas Medical Society, has been appointed a member of the Kansas State Board of Health.

GILBERT G. COTTAM, M.D., of Sioux Falls, S. D., has been appointed Superintendent of the South Dakota State Board of Health, to succeed the late J. F. D. COOK, M.D. W. R. GIEDT, M.D., Assistant State Health Officer and until Dr. Cottam's appointment, Acting Superintendent of the Board of Health, has resigned to accept a position as Epidemiologist for the State Health Department of Washington.

I. R. VAUGHN will head the Division of Public Health Education, which has recently been established by the South Dakota Health Department. Mr. Vaughn is also Assistant Director of the Division of Vital Statistics.

Eastern States

VLADO A. GETTING, M.D.,* since 1942 Commissioner of Health of Worcester, Mass., has been appointed Commissioner of Public Health of Massachusetts to succeed PAUL J. JAKMAUH, M.D.,† of Boston.

ROGER E. HEERING, Passed Assistant Surgeon, U. S. Public Health Service, has been lent to the State of Ohio for service as Venereal Disease Control Officer. Dr. Heering came from District No. 1, U.S.P.H.S., with headquarters in New York, where he had been Venereal Disease Consultant for 10 states included in the district. Dr. Heering had been lent to Ohio during the period 1939–1940 as Venereal Disease Control Officer in the Cincinnati area.

JOSEPH LACHMAN, M.D., formerly of Chester, Pa., U. S. Public Health Service, was recently appointed in charge of the Pulaski and McCreary County Health Departments.

PROFESSOR SAMUEL CATE PRESCOTT,* of Brookline, Mass., Emeritus Dean, School of Science, Massachusetts Institute of Technology, Cambridge, Mass., has been awarded the Nicholas Appert Medal of the Chicago Section, Institute of Food Technologists. Eligibility for the award, established in 1941, is based on preëminence in the field of food technology and on contributions to the progressive development of food manufacture and processing.

* Fellow A.P.H.A.
† Member A.P.H.A.

WILLIAM A. SAWYER, M.D.,* since 1919 Medical Director of Eastman Kodak Company, Rochester, N. Y., has received the 1943 W. S. Knudsen Award of the American Association of Industrial Physicians and Surgeons, for "outstanding work in control of tuberculosis, constructive contributions to a practical program of nutrition in industry, and setting up a program of rehabilitation for handicapped workers in industry."

CHARLES F. WILINSKY, M.D.,* Executive Director and Superintendent of the Beth Israel Hospital, Boston, Mass., on April 12 was awarded the annual medal of the Boston City Club for distinguished civic service. Dr. Wilinisky is Chief Medical Officer of the Boston Public Safety Committee and his selection for the medal was "the outcome of his work in organizing the medical section of the city's civilian defense effort, and for his work during the Cocoanut Grove disaster." The gold medal is presented each year to the civilian adjudged by the club to have rendered the most outstanding civic service to Greater Boston.

SAVEL ZIMAND,* an administrative assistant in the New York City Health Department for 9 years, has been appointed Acting Director of the Bureau of Health Education. He succeeds CHARLES F. BOLDUAN, M.D.,* first director of the Bureau, who has reached the retirement age.

Southern States

ANTHONY J. BOROWSKI, DR.P.H.,† until recently Chief of the Health Section of the Federal Works Agency, Works Progress Administration, Washington, D. C., has been appointed Chief Clerk and Statistician of the Division of Records and Statistics of the Richmond Department of Public Health.

JOHN S. CHAMBLEE, M.D.,† of Windsor, N. C., Health Officer of Bertie and Chowan Counties, has been appointed Health Officer in Nash County, succeeding THOMAS O. COPPEDGE, M.D.,† of Nashville, resigned.

LELAND H. DAME, M.D.,† Director of the Seminole County Health Unit, Sanford, Fla., was elected President of the Florida Public Health Association at the recent annual meeting in Jacksonville.

DR. W. HARRY FEINSTONE,† formerly associated with Johns Hopkins University, Baltimore, Md., has been appointed as Director of Biological Research by the Pyridium Corporation Yonkers, N. Y.

DOUGLAS H. FRYER, M.D., D.P.H.,† Director of the Rockingham County Department of Health, Spray, N. C., has accepted an appointment as director of the combined county and city health departments at Bay City, Mich.

MAJOR HAROLD B. GOTAAS,† Chief Engineer, Division of Health and Sanitation, Coördinator of Inter-American Affairs, has returned from South America, where he was working on the health and sanitation projects in the different countries.

CHESTER A. HICKS, M.D., DR.P.H.,† Surgeon Reserve, U. S. Public Health Service, was appointed Director of Public Health of the City of New Rochelle, N. Y., on May 1, 1943. Up to this time Dr. Hicks served as Director of Health of the Carter Unicoi-Johnson Health District, Elizabethtown, Tenn.

CHARLES N. LEACH, M.D., C.P.H.,* of Montgomery, Ala., was in Manila, Philippine Islands, at the time of the Japanese invasion and has been interned as a prisoner of war since that time.

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THEODORE R. SHROP, M.D.,† assumes his duties as Health Officer of Garrett County, Maryland, as of July 1, holding at the same time the appointment of Deputy State Health Officer in that county, which is also known as the First Sanitary District under the Maryland State Department of Health.

BRIGADIER GENERAL JAMES STEVENS SIMMONS,† A.U.S., Director of the Preventive Medicine Division of the Office of The Surgeon General, U. S. Army, Washington, D. C., has been appointed Lecturer in Public Health on the Staff of the School of Medicine at Yale University, New Haven, Conn.

Western States

DONALD J. BOURG, M.D.,† of The Dalles, Ore., recently Health Officer of Wasco and Sherman Counties, has been named Health Officer in Benton and Polk Counties, with offices in Corvallis.

CLAUDE C. CHICK, M.D., has been named Health Officer of Hood River, Ore.

EDWARD E. DART, M.D.,† formerly Director of Industrial Hygiene in the Department of Health of the City of Los Angeles, Calif., has resigned to accept a position with the Chrysler Corporation in Chicago, Ill. YALE ROSENFELD, Assistant Sanitary Engineer, U. S. Public Health Service (R), has been appointed Acting Director of the Division of Industrial Hygiene in Los Angeles.

WILLIAM E. STEELE, M.D., of Olympia, Wash., has resigned as Chief Medical Adviser to the State Department of Labor and Industries, to engage in private practice in Seattle. Dr. Steele, who held the State position for 7 years, will be named Consultant to the Department in the Seattle area.

HAROLD B. STOUT, M.D., of Brewster, Wash., has been named Health Officer of Pateros.

RAGNAR T. WESTMAN, M.D., DR.P.H.,* Surgeon (R) in the U. S. Public Health Service, on April 29 was appointed Acting Commissioner of Health of Seattle, Wash., succeeding FRANK M. CARROLL, M.D.,† retired.

Canada

AIME COUSINEAU, C.E.,* City Sanitary Engineer, Health Department, Montreal, Canada, is now Director of the City Planning Division. He retains his post as City Sanitary Engineer of the Health Department.

ANTOINE B. VALOIS, M.D., M.P.H.,† has been appointed demographer and Superintendent of the Vital Statistics Division of the Montreal Health Department, P. Q., Canada. He is a graduate of the University of Montreal and Johns Hopkins School of Hygiene and Public Health. He succeeds EUGENE GAGNON, M.D., deceased.

Mexico

DR. VICTOR FERNANDEZ MANERO,† Chief of the Federal Department of Health in Mexico, Mexico City, was recently presented with the diploma and the gold medal of a fellow honoris causa of the International College of Surgeons as a token of national appreciation for his work on public health in Mexico.

Deaths

WARREN F. DRAPER, JR., M.D.,* of Paris, Tex., Health Officer of the Paris-Lamarr Health Unit, died in May.

PROFESSOR MARTIN H. KNUTSEN,† a member of the Association since 1919, died on February 6 after a

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